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REPORT
OF THE
MUNICIPAL COMMISSIONER
ON
THE PLAGUE IN BOMBAY
FOR THE YEAR ENDING 31ST MAY 1900.

Part I.—General Administration.

Part II.—Hospitals (Public & Private.)

Bombay:
PRINTED AT THE "TIMES OF INDIA" PRESS.
1901.

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REPORT

OF THE

MUNICIPAL COMMISSIONER

ON

THE PLAGUE IN BOMBAY

FOR THE YEAR ENDING 31ST MAY 1900.

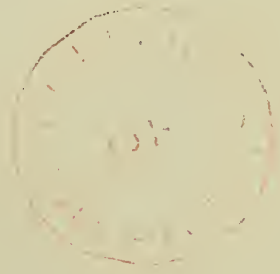
PART I.

GENERAL ADMINISTRATION.

Bombay:

PRINTED AT THE "TIMES OF INDIA" PRESS.

1901.



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No. OF 190 .

FROM

W. L. HARVEY, Esq., I.C.S.,
Municipal Commissioner for the City of Bombay,

TO

THE UNDER SECRETARY TO GOVERNMENT,
General Department (Plague).

MUNICIPAL COMMISSIONER'S OFFICE,
BOMBAY, *December 1900.*

SIR,

I have the honour to forward herewith the Report on Plague Operations in Bombay during the year ending 31st May 1900.

2. Mr. J. H. DuBoulay, I.C.S., was in charge of general plague operations throughout the year, and Col. Wilkins, D. S. O., exercised control over all hospitals and camps from the time of his return to plague duty in September 1899 till the end of the year. In forwarding their last Annual Report I brought to the notice of Government the very valuable services rendered by these officers, and it only remains for me to add that during the period under report their duties were carried out with the utmost tact, zeal and ability. Mr. DuBoulay has now proceeded on furlough and Col. Wilkins has reverted on promotion to the Military Department, and while the loss to plague administration is a severe one, the admirable state of efficiency in which these officers left the departments subordinate to them has rendered the task of their successors lighter than it might otherwise have been.

3. The services rendered by the Staff Corps Officers in charge of Districts were maintained at the same high standard as before and the ease with which they adapt themselves to this class of work, requiring as it does, tact, sympathy with the people and withal firmness, demonstrates their peculiar suitability for it. Many of our most experienced officers have been withdrawn owing to the exigencies of Military duty, and their services have been separately acknowledged by Government; of the others who have served for the greater part of the year I would specially mention Captain Pritchard and Lieutenants Dalgleish and Browne, as deserving the commendation of Government for their excellent work. The constant changes among District Officers detailed in paragraphs 1—3 of the Report undoubtedly interfered with the efficiency

of the administration, and I may be allowed to express a hope that during the coming season it will not be necessary to make so many transfers. However able and zealous a new officer may be he requires time to obtain the confidence of the people in his charge, and until he obtains this he cannot effect much.

- * 1 Dr. K. B. Shroff, Deputy Health Officer.
- 2 " Britto.
- 3 " Fazal Ahmed.
- 4 " R. V. Patel.
- 5 " Dady Burjor.
- 6 " Bardi.
- 7 " Matthal.
- 8 " Kapadia.
- 9 " Pedneker.
- 10 " Munshi.
- 11 " Contractor.
- 12 " Jayakar.
- 13 Mr. Guider.

4. The staff subordinate to the District Officers have carried out their duties to my entire satisfaction. Among the Sectional Medical Officers I would specially mention those noted in the margin* as having been very successful in the performance of the work assigned to them.

I have the honour to be,
Sir,
Your most obedient Servant,

W. L. HARVEY,

Municipal Commissioner
for the City of Bombay.

CHAPTER I.

ADMINISTRATIVE DETAILS.

Personnel.

The Municipal Commissioner, Mr. W. L. Harvey, I.C.S., continued in charge of Plague operations in Bombay throughout the year; the duties of Special Medical Officer for Plague operations were carried out by Dr. C. H. Cayley, Divisional Health Officer, Bombay, from the beginning of the year till he went home on leave. They were then undertaken by Capt. H. A. L. Howell, R.A.M.C., from 31st July 1899, till Lt.-Col. J. S. Wilkins, D.S.O., I.M.S., returned to this post on 11th September 1899. Lt.-Col. Wilkins held charge till the end of the year, and was assisted by Dr. E. L. Hunt, from 2nd January 1900 till the end of the year. Mr. J. H. DuBoulay, I.C.S., continued as Deputy Commissioner for Plague operations throughout the year.

No change was made in the division of the City into districts for the purpose of Plague administration during the year. The following statement shows the names of the officers from time to time in charge of the various districts :—

*A. Ward : comprising Colaba (Upper, Middle and Lower), Fort (North and South), and the Esplanade :—*Capt. F. R. E. Lock, I.S.C., was in charge throughout the year.

*B. Ward, South : comprising Mandvi and most of Chukla :—*Lieut. W. J. W. Brackenbury, I.S.C., was in charge till the 16th November, when he went on one month's privilege leave, and again from 18th December 1899 till 30th April 1900, when he was recalled to Military duty. Lieut. W. C. French, I.S.C., was in charge during Lieut. Brackenbury's absence on privilege leave. Lieut. M. H. B. Geddes took charge when Lieut. Brackenbury was re-called, and remained in charge till the end of the year.

*B. Ward, North : comprising Dongri and part of Umarkhari :—*Capt. G. A. Brownrigg, I.S.C., was in charge from 6th June 1899 to 30th October 1899, when he reverted to Military duty. Lieut. E. E. C. Dalglish, I.S.C., was in charge from 28th November 1899 till the end of the year. From 1st to 6th June and 30th October to 28th November 1899, Captain H. E. Pritchard, I.S.C., held charge.

*C. Ward : comprising Market, Dhobitalao, Fanaswadi, Kumbharwada and most of Bhuleshwar :—*Capt. W. A. Cuppage, I.S.C., was in

charge throughout the year and was assisted at various times by the following officers :—

Lieut. L. B. H. Haworth, I.S.C., from 27th June to 12th August, 1899.

Lieut. H. E. Browne, I.S.C., from 17th October 1899 to the end of the year.

Lieut. O. A. G. Fitzgerald, I.S.C., from 20th December 1899 to 19th February 1900.

Lieut. G. G. M. Wheeler, I.S.C., from 20th December 1899 to 12th January 1900.

Lieut. M. H. B. Geddes, I.S.C., from 20th January to 29th April 1900.

Lieut. J. L. Furney, I.S.C., from 19th February to 26th April 1900.

Lieut. A. C. Hobson, I.S.C., from 20th April 1900 to the end of the year.

Capt. G. D. L. Chatterton, I.S.C., from 25th April 1900 to the end of the year.

*D. Ward : comprising Khetwadi, Girgaum, Chowpatti, Walkeshwar and Mahalaxmi :—*Capt. P. Dunbar Stuart, I.S.C., was in charge throughout the year.

*E. Ward, West : comprising Kamatipura, Tardeo and 1st Nagpada :—*The beginning of the year found Lieut. W. C. French, I.S.C., in charge. He went on three months' privilege leave on 13th August 1899 and was relieved by Lieut. Haworth. Lieut. Haworth was re-called on 15th November and Lieut. C. G. Ames took his place, till Lieut. French returned to this district on 19th December 1899. On Lieut. French's reversion to Military duty on 12th April 1900, he was relieved by Capt. A. Chichester who continued in charge till the end of the year.

*E. Ward, East, Byculla : comprising the larger portion of Byculla :—*Capt. W. H. Wooldridge, I.S.C., was in charge throughout the year.

*E. Ward, East, Wari Bundar : comprising Mazagon and Tarwari :—*Capt. A. T. Walling, I.S.C., was in charge throughout the year ; from 1st to 27th June 1899 he was assisted by Lieut. Haworth, who was then transferred to C. Ward.

*F. and G. Wards : comprising Parel, Securi, Sion, Mahim, and Worli :—*The beginning of the year found Capt. C. E. Lewis in charge. He was relieved of the district charge on 20th August, and of the charge of Stores on 29th September 1899, by Capt. C. C. Boileau, I.S.C., and reverted to Military duty.

Lieutenant J. A. Stewart, I.S.C., assisted in this district from 1st to 3rd June 1899, Lieut. J. D'Oyly, from 28th October 1899 to 16th May 1900 and Lieut. W. C. Paleologus throughout the year.

*Central District: comprising Kharatalao, 2nd Nagpada and portions of Umarkhari, Chukla, Bhuleshwar, and Byculla :—*The beginning of the year found Lieut. Warneford, I.S.C., in charge. From 5th June 1899, on Lieut. Warneford's recall, Captain H. E. Pritchard, I.S.C., was in charge till the end of the year. He was assisted by :—

Lieut. J. A. Stewart, I.S.C., from 3rd to 12th June 1899.

Lieut. V. G. Menzies, I.S.C., from 7th June to 22nd November 1899.

Lieut. E. E. C., Dalgliesh, I.S.C., from 24th October to 28th November 1899.

Lieut. O. St. J. Skeen, I.S.C., from 26th October 1899 to 15th March 1900.

Lieut. Nicolas, I.S.C., from 22nd November 1899 to 19th December 1899.

Lieut. J. C. Coldstream, I.S.C., from 19th December 1899 to 2nd April 1900.

Lieut. C. G. Ames, I.S.C., from 20th December 1899 to 2nd February 1900.

Capt. A. H. Bolton, I.S.C., from 8th February 1900 to the end of the year.

Lieut. A. V. Searle, I.S.C., from 20th March 1900 to the end of the year.

Lieut. E. W. Ballantyne, I.S.C., from 14th April 1900 to the end of the year.

Measures.

Except that inoculation was vigorously pushed and to some small extent replaced evacuation, there was no change in the general outline of the measures adopted.

CHAPTER II.

THE COURSE OF THE EPIDEMIC.

Population in
Bombay.

The following statement very roughly indicates the population in Bombay during the year. It is compiled from the returns of emigration and immigration furnished by the Collector of Bombay. The prevailing opinion during the year was that the City was exceedingly full, and this belief may have been partly due to the crowds of Kathiawari refugees who constantly met the eye. In any case the results given are in direct contradiction of the general opinion.

Month.								Population.
1st July	1899	...	...	...	...	...	...	7,71,000
„ August	„	...	...	...	...	...	...	7,67,000
„ September	„	...	...	...	...	...	...	7,73,000
„ October	„	...	...	...	...	...	...	8,11,000
„ November	„	...	...	...	...	...	...	8,08,000
„ December	„	...	...	...	...	...	...	8,01,000
„ January	1900	...	...	...	...	...	...	7,80,000
„ February	„	...	...	...	...	...	...	7,41,000
„ March	„	...	...	...	...	...	...	7,08,000
„ April	„	...	...	...	...	...	...	6,67,000
„ May	„	...	...	...	...	...	...	6,65,000
16th May	„	...	...	...	...	...	...	6,42,000
Total.....								89,34,000
Average for the year in round numbers ...								7,40,000

Utilising the figures given in last year's report, the average population for recent years is as follows :—

For years immediately preceding the outbreak of plague,	8,50,000
For 1896-97	7,00,000
For 1897-98	7,90,000
For 1898-99	8,50,000
For 1899-1900	7,40,000

The following statement shows the total recorded number of Plague attacks and deaths in each section during the year ending 31st May 1900 :—

Wards.	Sections.	Attacks.	Deaths.
A	Upper Colaba	50	26
	Middle and Lower Colaba	434	320
	Fort Southern	54	2
	Fort Northern	768	548
	Esplanade	39	153
B	Mandvi	1,085	878
	Chukla	632	337
	Umerkhadi	792	660
	Dongri	882	600
C	Market	999	591
	Dhobi Talao	680	486
	Fanaswadi	574	327
	Bhuleshwar	1,048	527
	Khara Talao	809	330
D	Kumbharwada	999	667
	Khetwadi	476	621
	Girgaum	655	575
	Chaupati	110	99
	Vakreshwar	254	196
	Mahalakshmi	138	202
	Mazagon	470	378
E	Tarwadi	303	374
	2nd Nagpada	674	259
	Kamathipura	634	719
	Tardeo	441	430
	Byculla	1,565	1,119
F	1st Nagpada	311	284
	Parel	641	781
	Sewri	154	91
	Sion	483	384
G	Mahim	609	490
	Worli	546	470
	Water Division	1	4
	Non-Resident and Unknown ... ..	.....	.....
	Total... ..	18,310	13,928

From 28th June to 11th October, 143 of the cases that occurred were imported.

**Plague deaths,
including
suspicious.**

Section.										No.
A WARD—										
Colaba	...	...	...	...	...	...	...	...	...	405
Fort and Esplanade	...	...	...	...	...	...	...	...	...	967
B WARD, SOUTH—										
Mandvi	...	...	...	...	...	...	...	...	...	1,273
Chukla (Portion)	...	...	...	...	...	...	...	...	...	590
B WARD, NORTH—										
Umerkhadhi (Portion)	...	...	...	...	...	...	...	...	...	579
Dongri	...	...	...	...	...	...	...	...	...	1,419
C WARD—										
Market	...	...	...	...	...	...	...	...	...	899
Dhobi Talao...	...	...	...	...	...	...	...	...	...	667
Panaswadi	...	...	...	...	...	...	...	...	...	469
Bhuleshwar (Portion)	...	...	...	...	...	...	...	...	...	366
Kumbharwada	...	...	...	...	...	...	...	...	...	1,007
D WARD—										
Khetwadi	...	...	...	...	...	...	...	...	...	942
Girgaum	...	...	...	...	...	...	...	...	...	774
Chowpatti	...	...	...	...	...	...	...	...	...	193
Walkeshwar	...	...	...	...	...	...	...	...	...	282
Mahaluxmi	...	...	...	...	...	...	...	...	...	391
E WARD, WEST—										
Kamatipura	...	...	...	...	...	...	...	...	...	1,708
Tardeo	...	...	...	...	...	...	...	...	...	905
1st Nagpada	...	...	...	...	...	...	...	...	...	452
E WARD, EAST (BYCULLA)—										
Byculla (Portion)	...	...	...	...	...	...	...	...	...	1,798
E WARD, EAST (WADI BUNDER)—										
Mazagon	...	...	...	...	...	...	...	...	...	581
Tarwadi	...	...	...	...	...	...	...	...	...	238
Ghorupdeo (Consists of a portion of Mazagon and a portion of Tarwadi)	...	...	...	...	...	...	...	...	...	486
F & G WARDS—										
(f) Parel	...	...	...	...	...	...	...	...	...	1,124
Sion	...	...	...	...	...	...	...	...	...	253
Sion and Sewri	...	...	...	...	...	...	...	...	...	409
Mahim and Worli	...	...	...	...	...	...	...	...	...	969
(g) Worli	...	...	...	...	...	...	...	...	...	858
CENTRAL DISTRICT—										
Chukla (Portion)	...	...	...	...	...	...	...	...	...	167
Umerkhadhi (Portion)	...	...	...	...	...	...	...	...	...	945
Bhuleshwar (Portion)	...	...	...	...	...	...	...	...	...	796
Khara Talao...	...	...	...	...	...	...	...	...	...	1,077
2nd Nagpada	...	...	...	...	...	...	...	...	...	879
Byculla (Portion)—(Madanpura)	...	...	...	...	...	...	...	...	...	777
										25,645

**Total
lity. Morta-**

The following statement shows by sections the average yearly mortality and the actual mortality for four years, from 1st June 1896 to 31st May 1900, together with the average population and the death-rate per mille :—

Wards.	Sections.				Average.	Actual Mortality.			
					Mortality for 5 years from 1891.	1896-97.	1897-98.	1898-99.	1899-1900.
A	Upper Colaba...	...	...	...	114	164	131	135	165
	Middle and Lower Colaba	...	...	...	337	670	804	873	881
	Fort, Southern	...	...	...	29	37	25	12	4
	Fort, Northern	...	...	...	931	1,316	2,025	1,507	2,165
	Esplanade	...	...	...	167	143	254	446	760
B	Mandvi	...	...	...	1,455	2,422	2,364	2,794	3,763
	Chukla	...	...	...	1,269	1,910	2,255	1,921	2,433
	Umerkhandi	...	...	...	2,113	3,458	3,524	3,766	4,823
	Dongri	...	...	...	1,165	1,820	2,142	2,461	3,198
C	Market	...	...	...	1,140	1,503	2,168	1,898	2,564
	Dhobi Talao	...	...	...	1,297	2,171	2,590	1,874	2,475
	Fanaswadi	...	...	...	555	870	1,127	1,000	1,346
	Bhuleshwar	...	...	...	1,181	1,846	2,286	2,029	2,821
	Khara Talao	...	...	...	1,125	1,773	2,048	2,010	2,525
	Kumbharwada	...	...	...	1,152	1,599	2,369	2,729	3,231
D	Khetwadi	...	...	...	784	3,349	1,780	1,954	2,460
	Girgaum	...	...	...	965	1,577	1,999	1,782	2,140
	Chowpati	...	...	...	201	351	423	395	351
	Walkeshwar	...	...	...	236	437	253	307	490
	Mahalakshmi	...	...	...	280	578	500	631	881
E	Mazagon	...	...	...	998	2,071	2,336	2,386	2,867
	Tarwadi	...	...	...	522	937	1,105	1,516	2,542
	2nd Nagpada	...	...	...	938	1,725	2,132	1,853	2,505
	Kamatipura	...	...	...	1,370	2,753	3,272	2,668	3,555
	Tardeo	...	...	...	781	1,394	1,636	1,723	2,344
	Byculla	...	...	...	1,667	3,415	4,804	4,686	6,160
	1st Nagpada	...	...	...	393	608	738	798	1,294
F	Parel	...	...	...	1,217	1,932	2,727	2,705	3,446
	Sewri	...	...	...	180	430	295	464	506
	Sion	...	...	...	446	1,197	872	935	1,573
G	Mahim	...	...	...	587	1,666	1,234	2,086	2,693
	Worli	...	...	...	569	1,543	1,143	2,030	2,770
	Water Division	...	...	...	70	55	83	61	70
	Non-resident and unknown	...	...	...	615	2,492	2,283	892	.....
	Total	...	...	...	26,849	48,496	55,727	55,327	71,801
	Average population	...	...	...	8,50,000	7,00,000	7,90,000	8,50,000	7,40,000
	Mortality per mille	...	...	...	31.58	69.28	70.54	65.09	97.02

The following table shows for the past four years the extent to which the total mortality exceeded the average, after making deductions for Plague and suspicious deaths:—

Year.	Total Mortality.	Plague & Suspicious Deaths.	Balance due to ordinary causes.	Average Population.	Average Deaths on basis of 31.58 per mille.	Excess Mortality not due to Plague.
1896-97	48,496	11,683	36,813	7,00,000	22,106	14,707
1897-98	55,727	16,551	39,173	7,90,000	24,948	14,225
1898-99	55,327	19,958	35,369	8,50,000	26,849	8,520
1899-1900	71,801	25,645	46,156	7,40,000	23,369	22,787

It will be seen that the death-rate from normal causes was almost double the average. There were, however, recorded during the year 3,271 deaths from small-pox, 1,798 from measles, 346 from cholera and 523 from relapsing fever—total 5,938—and if these are deducted the balance of deaths due to ordinary causes in excess of the normal is reduced to 16,849. How far this excess was due to undetected Plague cases, and how far to the debilitating effects of famine, is a point upon which it is difficult to arrive at any satisfactory conclusion. The matter is dealt with in the following paragraph:—

Mortality of the City as a whole.

Diagrams showing the rise and fall of the general death-rate in Bombay, as a whole and for each section of the City, are attached to this report. Last year it was stated that the line of general mortality could be taken as a safe index to the rise and fall of plague; this remark cannot be applied to the year under report. In February 1900 the Government of India drew attention to the great and increasing mortality in the City of Bombay, only a small part of which was accounted for by the reported plague deaths. The following is transcribed from the Municipal Commissioner's report on the subject:—

The deaths due to measles, small-pox and relapsing fever as reported by the Sectional Medical Officers for the four weeks in question were as follows:—

Week ending	Measles and Small-pox.	Relapsing Fever.	Total.
6th January	131	18	149
13th „	194	28	222
20th „	260	22	282
27th „	293	23	316

If these are deducted from the figures in column C of statement B,* the excess mortality from ordinary causes over the average is as follows:—

Week ending 6th January	632-149 = 483.
„ 13th „	884-222 = 662.
„ 20th „	918-282 = 636.
„ 27th „	1081-316 = 765.

2. The circumstances of the year have been undoubtedly favourable to a high mortality. The failure of the monsoon drove into Bombay crowds of destitute paupers—many of them already enfeebled by privation. High prices have tended to reduce the standard of living of the lower classes, and the effect has been accentuated by the partial closing of many of the mills and a reduced demand for labour. The

water-supply has been limited and of inferior quality, and the cold was more severe than is often experienced in Bombay. There has been much sickness amongst all classes—Europeans and Natives alike. The European General Hospital has been crowded; and the following figures for the two big Native Hospitals—the Goculdas Tejpal and the Jamsetji Jijibhoy—speak for themselves :—

October to January.	Admissions.			Deaths.			Causes.														
	G.T.	J. J.	Total.	G.T.	J. J.	Total.	Plague.			Intestinal.			Respiratory.			Privation.			Other.		
							G.T.	J. J.	Total.	G.T.	J. J.	Total.	G.T.	J. J.	Total.	G.T.	J. J.	Total.	G.T.	J. J.	Total.
1895-96	787	1887	2674	107	336	443	..	..	..	22	60	82	27	80	97	23	25	48	35	171	206
1896-97	531	1283	1814	94	339	433	..	5	5	27	70	97	25	86	111	13	23	36	29	155	184
1897-98	776	1727	2503	182	538	720	..	1	1	30	132	162	43	178	221	73	9	82	33	218	254
1898-99	881	1798	2679	140	417	557	..	4	4	15	78	93	45	141	186	34	2	36	46	182	228
1899-00	1146	2119	3265	204	665	869	..	9	9	25	125	150	48	251	299	54	13	67	77	267	344

The percentage increase for 1899-1900 over 1895-96 was for these four months in the case of admissions 21, and in the case of deaths 96; while the percentage increase in deaths from diseases of the respiratory system was no less than 208.

3. The season has then been an unhealthy one and sickness of a serious character has been far more prevalent than usual. In this respect history is repeating itself, and if we look back to the famine of 1876-77, we find that for the year 1877 the mortality was 52·00 per mille against 32·25 for the previous year; and it is open to question whether in that year (1877) the enumeration of deaths was by any means perfect.

4. The excessive mortality has given cause for grave anxiety for months past and the District and Medical Officers have been steadily and constantly impressed with the necessity of exercising the strictest care in the diagnosis of cases, with a view to preventing any Plague escaping detection. They are held accountable for every death referable to their charges, and have, week by week, to indicate the method in which they have verified the cause of every death other than those treated as Plague or suspicious. The following table shows how far this verification was reliable for the weeks in question :—

	January 6th.	January 13th.	January 20th.	January 27th.	Total.
Plague and suspicious	572	745	843	895	3,058
Still-born	52	51	58	48	209
Deaths from ordinary causes in public hospitals	104	129	128	121	482
Seen by Municipal Medical Officers during last illness	280	329	375	400	1,384
Examined by Municipal Medical Officers after death	128	167	161	190	646
Certified by qualified medical men ...	135	159	149	169	612
Certified by unqualified medical men ...	26	24	32	43	125
Deaths in Lunatic Asylum, certified by Coroner, certified by Volunteers, etc., etc.	26	13	21	28	88
Deaths verified by enquiry only from friends, relatives, and neighbours ...	338	420	391	489	1,638
Total ...	1,664	2,037	2,158	2,383	8,242
Deaths not traced ...	66	73	123	110	372
Grand Total ...	1,730	2,110	2,281	2,493	8,614

5. Taking the total it may be pointed out that the proportion of deaths, not traced in the City, has fallen to less than 5 per cent. of the total number of bodies disposed of. It used 18 months ago to be often as much as 20 per cent.

6. By dint of constant pressure the proportion of deaths, ascribed to ordinary causes after enquiry only, is less than 20 per cent. of the total mortality, and of these a very large number (probably not less than half) occurred among infants, while a considerable portion of the remainder were small-pox deaths, about which there is little likelihood of mistake, in the case of which disinfection is invariably resorted to.

7. It will be seen that of the deaths from ordinary causes those that died in the public hospitals, under the best European Medical treatment, together with those seen by the Municipal Medical Officers during their last illness and still-born, actually number more than the total average deaths for the City, and in addition a number equal to more than half that average were either examined by Municipal Medical Officers after death, or certified by qualified Medical Practitioners in private practice.

The conclusion is almost irresistible that if the large excess mortality, ascribed to ordinary causes, is really due to Plague, then it is in a form not diagnosable by the means ordinarily available.

8. This conclusion is borne out by actual experience—cases are by no means infrequent where medical men, whether Municipal servants or private practitioners, are completely baffled by Plague in its earlier stages; and are only put on the right track by the tardy appearance of a bubo, or the sudden collapse of the patient and even then often remain in uncertainty until convinced by bacteriological examination of the blood. The accompanying copy of a report* from Dr. Choksey in charge of the Municipal Epidemic Diseases Hospital—an officer of the greatest experience—illustrates the difficulties of diagnosis. His opinion is, it will be observed, that these difficulties increase from year to year. The accompanying extract from a report* by Dr. Dhargalkar in charge of the Maratha Hospital, is also of interest from the same point of view. It will be seen that in their anxiety to be on the safe side the Medical Officers have sent to hospital not only a number of cases which could not be diagnosed, but also not a few which were eventually found not to be Plague. If Municipal Medical Officers can be deceived, it is highly probable that private practitioners, who are often not too anxious to diagnose Plague, should be deceived, and there is thus little doubt that a certain number of cases escape detection. It is also possible—though there is practically no evidence forthcoming on the point—that some part of the excessive infant mortality is due to Plague. If this is so, it must be Plague of a type peculiar to children, and of a type that has not yet been satisfactorily diagnosed.

9. It is easy to suggest remedies, but difficult to recommend them. Corpse inspection is unpopular and unsatisfactory, as outward signs of Plague are often not apparent. The only effective remedy would, in my opinion, be for Government to lay it down clearly and distinctly that every death which was not certified by a Municipal Medical Officer or an *authorised* private practitioner *not* to be due to Plague, should be treated as Plague. If the initial unpopularity of such a measure could be got over, we should, doubtless in a very short time, have all sickness seen by qualified Medical men. If it was undoubtedly Plague they would be bound to report it at once. If it was doubtful, it would be treated as Plague upon the death of the patient. The first essential of such a scheme would be a large additional staff of Medical men and Medical women.

10. It is probable that a few typical Plague cases may be escaping detection, but the increased number of roadside cases, now being found, indicate not only the unpopularity of Plague measures, but their efficiency. For the people would hardly,

for the sake of saving the house from disinfection and the people from going to camp, &c., turn the sick into the street, if they thought there was any chance of effective concealment.

Accompaniments to the above report.

Dr. Choksey's report.

With reference to your inquiry as to the difficulty in diagnosing cases of Plague in the epidemic of 1898-99 and the present epidemic, I have the honour to state that it is almost impossible to diagnose a certain proportion of cases of Plague, in as much as they present no evident symptoms, and are unaccompanied by visible signs, i.e., buboes, or sputum. There are also, in addition to the above, some cases that have no buboes, but only a slight and almost imperceptible infiltration, more liable to be overlooked than otherwise, and which prove fatal within a short time. In all these there is a reasonable suspicion of Plague, and rapid death alone, with or without a bacteriological examination, confirms them as Plague cases.

It is evident that cases of such types exist in greater numbers than shown in Hospital Returns, and are likely to be mistaken for ordinary fever. It is only where they prove rapidly fatal that suspicion is aroused.

The difficulty in diagnosing such cases is no doubt becoming greater every year, as the disease tends to change its type, time after time, and even during a single epidemic it seems to run in cycles of a particular type for certain definite periods. As an instance of this may be cited the cases admitted into the Arthur Road Hospital in January 1900. Many of these were cases of septicemic Plague with and without buboes, with normal or subnormal temperature in the morning and the evening temperature not exceeding beyond 100 or 101 and accompanied by a weak and extremely irregular and intermittent pulse. Such cases, if not closely investigated, are extremely likely to be overlooked, and so also cases of plain infiltrations unaccompanied by buboes and proving rapidly fatal. The former type has now totally disappeared, whereas the latter still exists.

Most of the cases sent as "suspicious" to this hospital turn out to be relapsing fever which, without much previous experience, it is not easy to diagnose off-hand. And about 90 per cent. of relapsing fever admissions into the hospital have been diagnosed as such from the observation wards, where they had been admitted, as "suspicious" cases.

As regards Plague, about 10 to 15 per cent. of the total admissions have been similarly diagnosed from the Observation Wards.

Extract from Dr. Dhargalkar's report.

* * * * *

In the epidemic of 1899, 225 cases were sent for observation in the month of January, out of which 49 cases developed Plague. It was not very difficult to diagnose a Plague case during that epidemic, as more than 70 per cent. of cases developed Plague, while out of 426 Plague cases sent to this hospital, during January 1899, ten cases proved to be diseases other than Plague.

In the present epidemic a large number of cases is sent for observation which die within 2 or 3 days and in which the diagnosis remains doubtful. On the other hand a large number of patients is sent to the hospital as Plague cases but which turn out to be either relapsing fever or smallpox cases. So the difficulty in diagnosing Plague cases during the present epidemic is increased. During the month of January 1900, 235 cases were sent for observation, of which 30 cases developed symptoms of Plague, but a large number died in which the diagnosis has not been certain. Out of cases sent as Plague about 22 cases proved to be diseases other than Plague.

STATEMENT B.

*Weekly statement of mortality in Bombay City for January 1900.
(Prepared from the weekly summaries of Plague operations
in Bombay City.)*

1	2	3	4	5	6
Week ending	Total Mortality.	Plague Deaths (including cases treated as suspicious).	Difference between total mortality and Plague deaths.	Normal Mortality.	Difference between column 4 and column 5.
6th January 1900	1,730	575	1,155	523	632
13th " "	2,110	745	1,365	481	884
20th " "	2,281	843	1,438	520	918
27th " "	2,493	895	1,598	517	1,081

In supplement of the above report the following table shows the verification of deaths from the week ending 4th November 1899 to the week ending 26th May 1900 :—

Plague	...	...	...	...	14,806
Suspicious	...	...	...	...	7,687
Still-born	...	...	...	...	1,325
In Hospital	...	...	...	...	3,334
Seen by Sectional Medical Officers during last illness	...	...	...	...	8,390
Seen by Sectional Medical Officers after death	...	...	...	...	3,891
Certified by qualified Medical practitioners	...	...	...	...	4,263
Certified by unqualified practitioners	...	...	...	...	665
Deaths certified by Coroner, in Lunatic Asylum, certified by Volunteers, &c., &c.	...	...	...	...	672
Deaths certified by enquiry <i>only</i>	...	...	...	...	10,025
Deaths unaccounted for	...	...	...	...	2,047
Total Deaths					57,105

The average mortality for this period, taken from the figures for the 5 years preceding the first outbreak of Plague, may be taken at 15,500. The deaths put down to ordinary causes, including small-pox, relapsing fever, and other epidemic diseases, number 34,612 ; and of these nearly two-thirds were verified by methods upon which it is impracticable to improve. As pointed out in the Commissioner's report above, the conclusion is almost irresistible that if the large excess mortality was really due to Plague, then it was in a form not diagnosable by the means ordinarily available.

The following extracts from reports received from various officers will suffice to illustrate the difficulties they had to contend with in the matter of diagnosis :—

Extract from Captain Dunbar Stuart's report for the week ending 12th August 1899 :—

This man came originally from Nana's chawl as a contact. On the 7th he was seen by Dr. DaGama and myself, apparently suffering from some cerebral complaint, rather tongue tied. He was sent to J. J. Hospital who transferred him to Arthur Road Hospital for observation. On the 9th August, Arthur Road Hospital telephoned the man had developed Pneumonic Plague. He died at 4 A.M., 12th August. This man was a labourer, working in Kamathipura Iron Factory.

Extract from Lieut. Brackenbury's report for the week ending 19th February 1900 :—

In another house 2 women living in adjoining rooms fell sick within 2 days, and developed buboes accompanied by fever. Dr. Mathai was of opinion that the first was Plague. The relatives asked to be allowed to call Dr. Viegas, who said it was not Plague. The 2nd case Dr. Viegas reported at first to me as Plague. Dr. Mathai thought it was not. The cases were kept under observation and the fever in both cases subsided so quickly that now both are confident that they are not cases of Plague.

Extract from Captain Lock's report for the week ending 3rd March 1900 :—

A Medical man in whom I have implicit trust reported a man to be ill in 97, Cawasji Patel Street, 3rd storey, stating that the man had measles, but that he was not satisfied as to whether he might not have Plague. He promised a final decision next morning. The man did not live until the morning and died during the night. The doctor gave a certificate of measles. Two days after 2 children on the 2nd floor were attacked with Plague and removed. On close enquiry the history of this house shows that the tenants on the 1st floor had left 5 days previous to the death on the 3rd floor, owing to numerous deaths among rats, which were found irrespectively all over the house. I am convinced that the death on the 3rd floor was Plague, and the evidence of the sudden death, 2 days illness, pain under the arm, coupled with the description of a bubo, described as long standing by the Medical attendant, would bear out such a belief. Yet the Medical attendant was one of the most respected members of his profession, and I am sure acted in good faith.

This is a report from Byculla :—

I beg to report that four exceptional cases of Plague have come to my knowledge. All these persons were strong and sthenic between the age of 18 and 20. There were no buboes, nor high temperature (100-101), the tongue was dry and brown. No delirium and the patients could move about, nor were the eyes injected.

They lived in infected houses and were not inoculated. They were all new arrivals from the Deccan, and the chief point to be noticed was that they succumbed within 4 hours after medical examination without any signs or symptoms of having got worse.

All these cases occurred on Haines Road.

I beg to remain,

Sir,

Your most obedient servant.

(Sd.) W. B. JAYAKAR, L. M. & S.,
Sectional Medical Officer,
E Ward, Byculla.

12th March 1900.

No. 605 of 12th March 1900.

Forwarded with compliments. These were true plague cases, as the first case Chandra Bloodhaji, male, 40 years, Maratha, who went to the Arthur Road Hospital, was diagnosed as Plague and died the same day.

W. H. WOOLDRIDGE, CAPT.,
District Officer,
E. East Byculla.

The following is a report made by Dr. D'Avoine :—

I have the honour to inform you that the little girl, Vithee Gunput, aged 8 years, residing at No. 71, Matharpakady Road, died of Plague this noon. I believe you will remember that I told you this morning that the case was very interesting and that I had placed her under close observation. She was suffering from fever for the last 9 or 10 days and was treated in some Railway Dispensary. According to the history, the pulse, tongue and general appearance, the case looked exactly like Remittent Fever. This morning, however, when I re-examined her I found a gland in the right axilla; the gland was very tender on pressure, and, although the child was in a dying condition, she felt pain when I pressed the swelling, while yesterday, although in a better condition, she did not feel any pain at all, when glands were being looked for.

Some days ago, when I was acting in D Ward, I called the attention of Captain Stuart to a similar case. A young woman living in Dépôt Lane, Girgaum, was attacked with fever, 7 days before she was seen by me. On re-examination I failed to detect any symptoms of Plague; in that case, too, the tongue, general appearance, &c., did not look like Plague. I re-examined her on the 9th day and found that a small gland had developed in the femoral region. She was removed to Hospital.

My reason in calling your attention to these cases is that nowadays there are many cases which are put down as Remittent Fever, most of them terminate fatally in 5 or 6 days, before glands are developed. I am inclined to think that these so-called Remittent Fever are only a new form of Plague. According to the two cases already mentioned it would appear that the glands developed very late (after the 7th day) in case the patient has enough of the *power of resistance* to live till that time, that the characteristic appearance of the tongue (red tip and edges) a compressible and weak pulse and the stupor-like and prostrated conditions, are absent in such cases.

Unfortunately, few cases live till the 7th or 8th day. In order to show further experience I would suggest that microscopic examination of the blood be made in such cases.

The following is a report made by Dr. Mathai :—

I inoculated the majority of the inmates of a Ghatee house, situated in D' Souza Street. After a suspicious death I used to visit the house regularly, but failed to detect any sickness, except one man suffering from chronic diarrhœa. Ten days after the abovementioned suspicious death, a young woman died after a few hours diarrhœa, the same girl was seen by me the previous morning, but I could not observe any serious illness which could have brought her end so soon.

Two days after this on examining the inmates of the house, I found four persons unwell, with a rise of temperature of 100° and 101° without any other signs of Plague. Next morning I was surprised to hear of three deaths in the same house. Of these, one was my first diarrhœa patient under observation, and so the cause of death was satisfactory in this case. The 2nd one was one of those cases I saw the previous day, and the 3rd one, though not seen the previous day, I examined the body and failed to detect any signs of Plague. I may here add that out of these many deaths in the house only one was inoculated. I am also informed by another Sectional Medical Officer that lately he also has come across certain deaths, occurring after a few hours diarrhœa; besides histories of similar nature I hear occasionally from the people of this section on my enquiring of the causes of death. I on my part think all these are a variety of Plague (Enteric).

Dr. Dady Sett on one occasion wrote as follows :—

I have the honour to inform you about a case of Plague I saw this morning in my surgery at Mandvi. The patient's name is Baloo Piama, living at Sitaram Kubha's chawl, in New Nagpada, Byculla. Of late I am getting in my practice a peculiar kind of fever without any bubo or cough, but the temperature rises to 103° F. in some cases, and a case turns fatal in a day or two. It is very difficult, therefore, to diagnose such cases, and I draw your attention to them. I have already reported such suspicious cases to the District Plague Officer of B. Ward, South. I saw to-day one case of Macbai Lalji at Clive Road, Mandvi. There is no bubo or cough but high fever. I have reported it also to the District Plague Officer.

The course of
the Epidemic
in each Dis-
trict.

Captain Lock gives the following account of the course of the epidemic in A. Ward :—

Fort Section.

June 1899. Sporadic cases of Plague—Borah Bazaar Street, Bazaar Gate Street, and Maruti Street. Number of cases 11.

July. 14 Cases of Plague—Cowasjee Patel Street and Bazaar Gate Street with one case in Meadows Street, Fort, South.

August. Epidemic amongst rats—31 cases of Plague. Parsee Panchayat Lane—Cowasjee Patel Street, Commissariat Chawl—Bhoiwar Lane. These Streets are all within a stone's throw of each other.

September. 32 cases of Plague—Cowasjee Patel Street, Gunbow Street, Borah Bazaar Street, Pitha Street, Bazaar Gate Street. Plague was still very local and out of 32, 17 were among Parsees. Great mortality of rats.

October. 25 cases of Plague—very little heard of rat mortality except in actually infected houses. Frere Road and Mint Road were attacked for the first time : 5 in the former and a sequence of cases in the latter, all traceable to an infected stable, which house is mentioned by Mr. DuBoulay in the first year of the epidemic as having been highly infected. In this month the epidemic made its first strides leaving the Parsee neighbourhood of Cowasjee Patel Street and Bhoiwar Lane which were so troubled during August and September. No reason can be assigned ; there is certainly very little connection either of society or business with the latter neighbourhood.

November. 40 cases of Plague. Fort, South, became infected ; 3 cases occurring in Bell Lane, Ash Lane and Armenian Lane. Frere Road and Mint Road continue infected and cases spread. Cowasjee Patel Street again re-infected : 3 cases in one house.

December. 128 cases of Plague—Borah Bazaar Street, again re-infected. Frere Road, Goa Street, European General Hospital, followers lines severely infected. Fort, South, and Esplanade continued free.

January. 117 cases of Plague—Frere Road, Mint Road, Mody Street, Borah Bazaar—a restricted area and quite marked in its general lines of house infection. Esplanade was attacked : Apollo Bunder Post Office stables, and 21st Bombay Infantry lines. Cowasjee Patel Street and Parsee Panchayat Lane, which were so badly hit during October, were quite free. Infection of Mahars and Mahrattas was very marked during this month. Clean-living Bhatias and Jains were attacked. Very noticeable how, instead of single case in infected houses, 2 and 3 persons were attacked.

February. 110 cases of Plague. Esplanade continues to be infected. Sailors' Home and Apollo Bunder claim victims. Europeans were first attacked. This month marks two strides in the course of the epidemic. Bomanjee Lane and Jeejeebhoy Dadabhoy Lane northwards and a second to Fort, South, marking Elphinstone Circle, Meadows Street, Forbes Street, Rope Walk Lane and Rutherford Street. This infected Section of Fort, South, is a fairly extensive area. From the 1st of the month there was a large mortality of rats coincident with the attacks among human beings. The big offices were constantly sending information of dead rats found, and it was in this neighbourhood that 14 cases alone occurred during the month.

March. 106 cases of Plague. Epidemic very localised in Fort, South, and not scattered as in preceding month. British Hotel Lane and Bell Lane distinctly marked. Mortality during this month very high in Pultan Road Municipal Chawl, but very little Plague acknowledged. Fort, North, continued, infected, but confined to the localities previously infected—Borah Bazaar Street, Bazaar Gate Street and Mint Road Street. Mangesh Senoi Street and Ghoga Street were infected for the first time. Dropping cases occurred in other directions, but nothing to mark severe infection.

April. 103 cases of Plague. This month is distinguished by scattered cases over the Esplanade. 21st Bombay Infantry Lines, 5 cases, Offices of Messrs. Ralli Brothers, Gilbert Payne, Solicitors, National Bank. In the latter offices rat mortality was very marked. Borah Bazaar Street, Bazaar Gate Street, Maruti Street, Mint Road, continue infected. Streets which all through the Epidemic have kept up their bad reputation. Fort, South, quite free.

May. 30 cases of Plague. Rat mortality is less noticeable. Plague cases were principally confined to roadside cases and scattered cases in Esplanade Section. Regarding the latter cases a history of rat mortality was invariable, and was very marked in the Cooperage Bungalow, Messrs. Sassoon Offices and Rev. Gray's bungalow, Marine Lines. Odd cases occurred in Maruti Street, Bazaar Gate Street and Mody Street, Gunbow Street; during this month Plague was epidemic in no part of this section.

Summing up the history of this section, I would emphasize the following conclusion :—

A few black patches on a sketch of the section would distinctly mark the infected areas—centres of the disease. That it is round these few centres that Plague has thrived, excepting Mint Road. I maintain that there is no question of doubt as to the reason why Plague has had such hold over these small local areas. There has, on the other hand, been much Plague in Mint Road—Plague in houses which are clean and well ventilated—amongst people who are healthy, educated and clean livers. This is unexplainable, except that this street lies in a neighbourhood liable to infection from any passing form of disease.

Infected areas.

Referring to the infected areas the houses in these small centres are old, ill-drained, badly ventilated; the houses are occupied by a narrow-minded, prejudiced class, ignorant of the most primitive laws of health as crowding together and careless in habits :—(1) Cawasjee Patel Street and its branching lanes covering a small limited area; (2) Maruti Street, Bomanji Lane and Police Court Lane; (3) North end of Borah Bazaar Street and Manordas Street; (4) Bell Lane, British Hotel Lane. If these above four centres could be cleared away, Plague would have little hold in the Fort Section.

I am aware that the numbers of Plague cases have not decreased very considerably this year; but at the same time the epidemic has been more localised, and it is this fact that raises the hope, that if these centres are efficiently dealt with, that the annual visitation from Plague can be stopped.

Beggars, Vagabonds and Effects of Famine.

From February to May 1900 the Fort Section suffered very much from an influx of emigrants from Kathiawar, Gujerat and Ahmednagar Districts, driven in by famine. The mortality amongst these people, who have been numbered at from 4 to 5 thousand, was very high. Wasted before arrival by hunger, eating food quite unsuitable to their condition of life, they were the first to be attacked by Plague. Sheltering in foul corners for shelter, using old rags picked up anyhow for bedding, it is little wonder that they were readily infected. It was this mortality partly that caused the mortality of the district to read so high. From the month of February to May 1900 there were 137; deaths (90), and removals (47) for Plague alone amongst these emigrants.

Colaba.

Course of the Epidemic.

June 1899.—6 cases of Plague, Thomas Street, infected.

July.—10 cases of Plague, Thomas Street, Hamal and Borah Streets.

August.—9 cases of Plague, 2 cases occurred in Nowroji Road and 2 cases on Victoria Bunder, a neighbourhood, which suffered most severely in the previous epidemics.

September.—5 cases of Plague, Hamal Street continued infected alone.

October.—11 cases of Plague continued in the village. A case occurred in Grant Buildings, on the Causeway, and again 2 cases occurred on Victoria Bunder.

November.—16 cases of Plague, Hamal Street alone severely infected, excepting 4th Koli Lane where Plague spread among the fishers.

December.—65 cases of Plague during this month; the epidemic was entirely confined to Colaba village; nearly every street being infected, except Hormasji and Maneckji Streets. Victoria Bunder being, except for 2 cases, quite free.

January.—67 cases of Plague,—Gun Carriage Street and Hamal Street were the centre of the disease in the village. This month infection was carried to Upper Colaba, 2 miles away, to the Lascar Lines where many cases occurred, and also to Apollo Bunder among the work-people on the new buildings occupying temporary huts. Colaba village was undoubtedly the centre from which infection spread, as there was close connection of class and occupation. Cases also occurred on Victoria Bunder but did not spread.

February.—112 cases of Plague. Lascar's Lines, Upper Colaba were terribly infected in one small chawl, 23 out of 52 being attacked almost simultaneously. The Military authorities acted with the greatest promptness. Mortality among rats very marked all over Colaba. The Tramway Stables, Colaba Causeway were badly infected. Cases still continued on Victoria Bunder. Infection very marked in Maneckji Street and Hamal Street.

March.—75 cases of Plague. Rat mortality still continued. History of rats in 3 cases which occurred in several bungalows of Middle Colaba. Lunatic Asylum attacked, which is quite out on the point. No Plague in Lascar Lines. Very bad in the village. Two cases in Grant Buildings.

April.—65 cases of Plague,—chawls of warders, Lunatic Asylum, highly infected. Bora Cross Lane and Thomas Street in the village continue infected. Victoria Bunder quite free; this was the neighbourhood which suffered so last year. All temporary buildings have been removed on this Bunder.

May.—24 cases. Remarkable that local segregation camp became infected, 3 cases occurred, but disease did not spread. Hamal Street and Pestonjee Street continue infected.

General Remarks.—From the above it will be noted that—as far as numbers of cases—the epidemic of Plague commenced in December 1899 and continued until the middle of May 1900. The village of Colaba consists of close narrow streets and lanes with a thick and numerous population consisting almost entirely of Mahrattas and Ghaties who are employed in the neighbouring mills, press companies and factories. It is this village, occupied by about 5,000, that has been the sole centre of infection to Colaba. It is to this village that cause of infection can be traced in enquiring into the history of any case occurring in the bungalows on Middle Colaba or amongst the followers of the Dépôt or of the Garrisons. I suppose, for their numbers, the people have suffered more than any community in Bombay. The disease has been almost entirely confined to this centre and has not spread anything like what it has in previous years to the neighbourhood. Excepting for a severe outbreak, covering a period of a week, amongst the Garrison followers, and for a similar attack among the warders of the Lunatic Asylum—Plague has been confined to the village. Victoria Bunder, with its 4 large chawls, has not been severely infected. The majority of persons attacked have been Mahrattas. A few Mussalmans and 4 Parsis represent the other castes so attacked, excepting the Mangs who are Garrison followers and who suffered heavily in the attack in February. Health in Colaba village is an impossibility. Small houses, ill ventilation and overcrowding are gradually making themselves more felt on the health of the people.

**B Ward,
North.**

The small portion of *Umerkhadi*, within the limits of B Ward, North, suffered severely throughout the year—there being only some 9 weeks during the first half of the year when it can be said that Plague was not epidemic. The disease began to attain still more serious proportions early in December and continued to rage with considerable fluctuations for the whole of the latter half of the year up to May 31st, 1900. In *Dongri*, which was never free from Plague, the disease attained epidemic dimensions during August 1899. The Plague and suspicious death-rate continued fairly steady till November, when its virulence doubled and again remained fairly steady till the end of December. It then increased till it attained its greatest violence during the last fortnight of February. After this there was a fairly steady decline, but the epidemic was by no means over at the close of the year.

**B Ward,
South.**

In *Mandvi* Plague was epidemic from 19th August 1899 to 21st October 1899, and again from 25th November to the end of the year. In the later and more serious of these two epidemic periods the death-rate from Plague and suspicious fever rose with great steadiness, attaining its maximum during the 6 weeks beginning 25th March and ending 5th May 1900.

In the portion of *Chukla*, included in B Ward, South, after more than once threatening, the disease assumed epidemic dimensions a week later than in Mandvi. Its severity was at its worst during the 9 weeks, beginning 11th March and ending 12th May 1900.

C Ward.

An extract from Captain Cuppage's report is given below:—

Market Section—The course of the epidemic for the year under review has been from South to North. The first case of Plague in the Market Section was observed on the 9th June 1899, being earlier than in the previous year. There were 8 cases in this month. In July 1899 the number of Plague cases was 28. It remained stationary in August of the same year, increasing slightly in September and raged in

epidemic form in October 1899. December 1899 was marked by a very high rise in the number of Plague cases, until it reached its climax in March. There was a decline in April, but not so marked as in the previous year. In the preceding year the number of Plague cases in April was 37, whereas there were 120 cases in April 1900. The total number of Plague cases in the Market Section, during the present epidemic, has been 1,040. The mortality from other causes increased with the number of Plague cases. A notable feature during the year under review has been a very high infant mortality.

Dhobi Talao.—With the exception of a few sporadic cases there was not much Plague in Dhobi Talao Section, until the beginning of October 1899, when it gradually increased and reached its maximum in March, continuing in a more or less virulent form through the first two weeks of April and then gradually declined. The community which suffered most was that of the lower class Hindus. Between May 28th, 1899, and May 26th, 1900, there were 338 Plague deaths and 208 Plague-suffering cases amongst Hindus and only 14 Plague deaths and 39 Plague-suffering cases amongst Parsis. The comparative immunity amongst the latter is due to their immediately vacating their houses on rats dying and taking advantage of their own health camps. Rats were in nearly every case the source of infection.

Plague, as a rule, reappeared in houses attacked last epidemic, but a particular row of buildings in Girgaum Road, which had many cases last year, showed very few this year. *Vice versa* houses, which were free last year, escaped this year.

Bhuleshwar.—In Bhuleshwar Section the epidemic did not commence until the beginning of the present year. There were a few mild cases in December 1899. Kika Street and all the Bhoiwadas suffered the most. Some houses, even after suitable alterations had been carried out, could not shake off the infection. Dr. Bardi is of opinion that the old debris and rubbish employed in the reconstruction of these houses may have something to do with it. Many of the first cases came from Mandvie Ward—especially those in Maruti Lane—Fopul Wadi, amongst Brahmin cooks employed by rich Hindus living in Mandvie. The Lohanas and the Brahmins were the heaviest sufferers, the others escaped, possibly because a majority of them left their houses for health camps in Dadar and other suburbs.

Fanaswadi.—Plague in epidemic form in Fanaswady showed itself in the latter part of December, gradually declining in April and May. Much the same localities were effected as in the preceding epidemic and the direction taken was practically the same throughout the Section. In almost every house, where there were Plague cases, rats may be attributed as the chief cause of infection. In Navi Wady, tenanted chiefly by Parbhus and high caste Brahmins, history pointed to dead rats having been found in one or two houses, and the whole street was immediately deserted, the people going to the suburbs or to their private health camps.

Kumbarwada.—During the months of July, August, September and October 1899, cases of Plague were frequently detected amongst persons who had come to Bombay from other places such as Satara, Karad, &c. It began in an epidemic form in Kumbarwada from the middle of December. The houses which had the worst histories during the preceding epidemic were the first to be attacked during the last : when once it assumed epidemic form it broke out in all parts of the section simultaneously. The low caste Hindus suffered the most. The following Streets, Bhandari, Kumbarwada and Duncan Road, were considerably over-crowded before the epidemic stage began by emigrants from Kathiawar, but chiefly by people from Karad and Wai Districts. 1st and 2nd Carpenter Streets owe their comparative immunity and low death-rate to the fact that numbers of them moved into the suburbs. It must be remembered that most of the houses in Kumbarwada are insanitary hovels, many of them not fit for a dog much less a human being to

live in, and occupied by people of the very poorest classes of filthy habits. Dead rats were found in many houses before and after occurrence of Plague cases. In house No. 240 Bhandari Street, several Plague cases occurred. Search was made for dead rats and a large number were found. A few days afterwards a case of Plague occurred in the adjoining house, which, up to this time, had escaped. The same thing happened in 151 and 145 Bhandari Street.

During the epidemic special difficulties were met with, as Plague shewed itself in various forms and simulated Remittent Fever, Typho-Remittent Fever, Simple Pneumonia, Cholera, Acute Diarrhœa and Dysentery. Owing to this, many cases of Plague may have been certified to as Remittent Fever, &c.

Captain Dunbar Stuart summarizes the epidemic history of D Ward, as follows :—

D Ward. *Girgaum and Khetwady.*—There is no doubt that Plague began in Girgaum and Khetwady about the same time, and I am of opinion that the infection came across the border in the case of Girgaum by probably Bhuleshwar, Khetwady from Kumbharwada side. The extraordinary fact about these two sections is that, they have nothing to do with one another in the way of Plague, though they are connected by Ardeshir Dady Street and 3 Parsiwadas, there is no link of Plague to unite the sections. Again, Girgaum Back Road separates the two sections, and yet again there is no link, so that for this reason I state that they got the infection from the borders.

Khetwady.—Khetwady again, though separated from E Ward by Grant Road, got none of its infection from that border, so that Khetwady and Girgaum independently started and ran northwards. Khetwady being bad about Goolpita end of Falkland Road, ran along Trimbuck P. Street, along Grant Road, through infected or seasonal houses.

Chowpaty.—Chowpaty got bad in August and September on account of three imported cases from Dongri, it then ceased ; again it began from another imported case, and spread round its own infected centre ; no connection with Girgaum, as there is a distinct line of cessation of Plague between the two.

Mahaluxmi.—Mahaluxmi got bad about December and that at the south end, and I am convinced that Khetwady is responsible for that, as the infection before stated ran along Grant Road, jumped across the bridge and got into Tardeo Road, only a distance of 200 yards or so ; it then ran northwards, into Arthur Road, branching off into the Temple Compound, where a few were found : not half so bad as last year.

Walkeshwar.—It is exceedingly hard to say where it got its infection from, most of the cases were among servants on the hills and in the Temple Compound. I daresay, as before explained, that Plague was kept up on account of the insanitary state of the place at the time of cleansing the tank.

There is no doubt that this year's Plague was more of a cerebral nature than Bubonic, probably due to the parties succumbing long before the buboes developed.

E Ward, West. *Kamatipura.*—The weekly record of Plague and suspicious deaths shows that Kamatipura never enjoyed any freedom from the disease. The epidemic period began in the middle of July and lasted till after the close of the year, the worst week being that ending 17th March 1900.

Tardeo.—In Tardeo the Plague mortality did not reach epidemic dimensions till the middle of November ; it was at its worst during the week ending 3rd March 1900, and, though the deaths were steadily

falling at the end of the year, the disease can hardly be said to have got out of the epidemic stage by the 31st May.

1st Nagpada.—As in Kamatipura, so in 1st Nagpada, the worst week was that ending 17th March 1900. The epidemic in other respects followed precisely the same lines as in Tardeo.

The following remarks from the report of Dr. Kapadia, Sectional Medical Officer, Kamatipura, are applicable generally to E. Ward, West :—

The present epidemic differed from that of the previous years in its late commencement. It commenced about the beginning of January, although infected cases were found in the section in the previous months, and daily gained in strength till about the end of April, when its virulence began to abate. There was not such a marked fall in the mortality as well as marked diminution in the number of cases as in the previous years but a gradual one. There was an unprecedented and terrible epidemic of small-pox such as Bombay people have not noticed for nearly a quarter of a century, and diarrhoea raged in an epidemic form for several weeks, carrying off many victims. There was no marked death-rate among the famine-stricken or immigrant vagabonds, but the poor people of the section readily fell victims to those and other diseases, because their constitution was greatly impaired, on account of the dearth of food and low wages consequent on the stoppage of several mills and other business places; and they were unable to resist their invasion. There were a large number of Vagris and Vadars and other arrivals from famine-stricken districts, who occupied and built temporary sheds over the available open spaces; but these, on persuasion, readily submitted to be inoculated, and hence there was very little Plague among them. From personal observations and from the report of leading residents of the section, I may state here that the population was about five or six thousand in excess of that in the previous year, and the increased mortality this year from other cases may be in part accounted for by this increase.

E Ward, Wari Bundar.

In the Wari Bundar District, including Mazagaum, Tarwari and Ghorupdeo, the worst of the epidemic was between the end of December and the end of March.

The District Officer, Captain Walling, writes as follows :—

The epidemic commenced in August 1899, gradually increasing until March when it began to subside. Hyderali's chawl, Parel Road, in Tarwari section, was first attacked, while about the same time the southern part of Mazagon section, *viz.*, Wari Bundar Road, where there was an accumulation of huts, was also attacked. The disease then gradually began to spread northwards in both these sections, until in the 3rd week of November it assumed epidemic form in Ghorupdeo section. In Mazagon section its course and progress appears to have been more uniform and less severe than in the preceding year; the Plague mortality for the year being only 399 as against 675 for 1898-99.

The disease first started in epidemic form in Wari Bundar Road, then spreading eastward, attacked Church Street, Dolkar Street, Carpenter Street and Muzawarpacadi. Koliwada, which lies to the extreme east of the section, and which was evacuated last year on account of the number of Plague cases, enjoyed a comparative immunity. Carpenter Street, which also last year was badly infected, practically escaped by the early exodus of the majority of its inhabitants. Nowanagar, situated in Magazine Road, however, suffered severely. Houses 34, 44 and 38 were hot-beds; 34 was temporarily evacuated and disinfected, whilst its tenants and

those of 44 and 38 were inoculated. The disease then travelled northwards to Matarpacadi, Mount Road and Goculdaswadi, but did not take a great hold, owing to inoculation. On its reaching Narielwadi village, in the extreme north of the section, there were a few cases only, owing to the inhabitants of the place vacating in a body.

In Gorupdeo section it started at the most southern part of the section, *viz.*, Tank Bunder Road huts, Ambewadi, Sassoon Mill compound, and then proceeded on towards the north gradually to Koliwada; thence to Gunpat Manekjee's chawls, Dhakjee Parbhus' Wadi, Husanally's chawls, Albert Road, Baban's chawl, Tapidaswadi and Moorgi's chawl. In the first week seven cases were noted and the numbers gradually increased weekly, until the maximum of forty was reached in the last week of March 1900. The decline then came gradually week by week, till in the last week of May no Plague case was noted in the section.

Byculla.

Of Byculla Captain Wooldridge writes as follows:—

This is the fourth year of the Plague epidemic, and the disease has been more severe in this than in previous years. This District was not free from Plague at any time during the past year; it only slumbered during the months of July, August, and September 1899, and the average weekly Plague death-rate was 7. Also from the beginning of June 1899 to the end of September of the same year, the average weekly mortality was below normal, that is, about 28. From the 1st October to the 2nd December it gradually rose, fluctuating between 30 and 49, and then for the week ending 9th December, it rose to 65 and increased steadily to 164 in the week ending 3rd March 1900. The fall was the same as its rise, gradual, and in the last week in May it fell to 74, and this gives a period of 25 weeks during which the mortality was more than twice, and even rose to more than five times, the normal rate. I attach a *rough diagram* showing both the total and Plague mortality of the ward. It will be seen that Plague deaths averaged about 50 per cent. of the total mortality throughout the whole year. There has been no other epidemic of a serious importance. The total mortality is 3,645. Last year this ward was not worked separately, so I cannot say what the rise is. I think 1,300 in the total and 752 in Plague. With the exception of Parel and Clare Roads, the whole ward has been thoroughly infected. The former is open, and the houses on the east side are mostly detached bungalows. On the west the chawls are few and far between. If it had not been for 6 dirty insanitary low buildings, off the road, near Topa Wani's chawl, Plague would most probably not have appeared. With the exception of Pallonji's hotel and the two adjoining buildings there has been no Plague in Clare Road; as it was, there were only 5 and it began in Pallonji's Hotel. The residents are well-to-do people.

F & G Wards.

Captain Boileau gives the following account of the course of the epidemic in F. and G. Wards.

This ward cannot be said to have been free from Plague at any time during the past year under report; but the epidemic proper did not begin until October. As early as July many sporadic cases occurred all over the District. Dr. Dady Burjor, from Mahim-sub-Division, writes:—

“Plague in Dharavi broke out, as usual, during the monsoon, and the Mahim hospital was opened for the benefit of the people; but nearly all the cases were concealed, and, when found, they were usually dead. At no time had this whole sub-Division a clean bill of health. In Mahim itself hardly had the disease showed signs of subsidence from the previous epidemic than people from infected localities outside came flocking in and started it again. Thus the first Plague case proper of the year under report came to Agar Bazaar from Nasik. Luxman Narher, 20 years old, Mah-

ratia Brahmin, gland left groin, arrived 5-7-99, died 8-7-99. The second case was imported from Poona and came to live near the Dhun Mill in a chawl No. 897, arrived on 21-7-99, got fever in the train, developed Plague, gland left axilla, died 23-8-99. The third case from D Ward, Rama Kashiram Sonar, age 10 months, was brought to Agar Bazaar on the night of 26-8-99, died 6 a.m., 27-8-99.

Mahim and Worli.—Rats appeared in this Sub-Division in the month of September in Agar Bazaar ; and it is curious to note that the people seemed to have had a dread of their arrival getting known to us, as the mortality of the rats was most carefully concealed until October, when on the 3rd of the month we had a regular outbreak in Agar Bazaar, which spread at once (preceded in every case by dead rats) through Mahim Bazaar, Bhandarwada, Lady Jamsetji Road, Hansali, Gopi Tank, Mori Road, Dadar Koliwada, Kumbarwada and Portuguese Church Road, and attacked chiefly the lower class of people."

Parel.—In Parel the first case occurred in July amongst the Baniahs in Lalwadi (and here again the infection was, no doubt, brought from Mandvi with the grain), and in 158 Arthur Road, near Jacob's Circle, but I am uncertain whether this was an imported case or not. In G Ward, Fergusson Road, there was also a regular crop of cases during July and August. These cases were all amongst lower classes. The rats began to die in Lalwadi about the beginning of September when several cases occurred, and after disinfection, broke out again in Soparibag Road a day or two after, where rats were found dead. Thence the rats seemed to have worked their way Northward and infected Elphinstone Road to the West, and Bhoiwada and Naigaon to the East, and from thence took their way across to Dadar into the Agar Bazaar, when the above-mentioned epidemic broke out in that Ward. This may only be coincidence, but it appears to me to be very like a case of rats taking the infection with them and disseminating Plague as they moved ; and my experience leads me to believe that, although infection can be given in various other ways, rats are in very great measure responsible for the majority of Plague cases. Rats have been found dead in nearly every house which has been disinfected for Plague ; and this year, which has been marked by a great number of Plague cases in the camps, I was much struck by the amount of rat-holes freshly dug all over the fields. I cannot say if the rats lived in the fields last year or not.

Sewri.—In the Sewri section dead rats were found by the Sub-Inspector in November and Plague cases followed. The people were evicted and Plague stopped for a while, but broke out again in January badly, when the whole community of Kolis were sent to camp on Port Trust ground. This quite put a stop to Plague in that part of the Ward. Plague broke out in Jakaria Bunder and Sewri New Road in April, but evacuation again stopped it.

Sion.—In the Sion, Wadalla, Matunga and Gowari Sections there was comparatively little Plague, and the first case, Shewran Agri, was imported into Sion from Mazagon in February. A few days after she went to hospital, dead rats were found in the adjoining houses, the inmates of which cleared out into the fields. A fortnight later another imported case appeared from Wadalla, but did not infect any more people. The first indigenous case of Plague appeared in Sion Road, a Sonar, age 12 years, attacked on the 18th, died 20th April. The second case occurred on 22nd and was followed by 5 or 6 others up to Sion village, where about 6 other cases occurred. The people then evacuated and no more cases occurred in epidemic form. Dead rats were hardly noticed this year and not in anything like the same numbers as in former years, which may account for the lightness of the visitation.

Wadalla and Naigaon.—Wadalla and Naigaon Road were also affected with several bad cases of Plague, beginning in the month of February, but a great many

people cleared out into the fields. They no doubt carried infection with them to the camps in Vincent Road, especially the Wadalla people, and had also a great deal of small-pox with them. The Plague cases used to be carried back to the village from the camps at night and left there and in this way several people were taken and sent to hospital.

After the first out-break of Plague, the disease seems to have settled nowhere in particular, but cropped up here and there all over the District, and in this respect seems to have followed the same course as in former years.

Although the number of vagrants and starving people, which came into and passed through this District, were enormous, still they appear to have added very little to the Epidemic.

**C e n t r a l
D i s t r i c t .**

The course of the Epidemic in the Central District is described by Captain Pritchard as follows :—

In Umarkhadi and Chakla, from June 1899 to November 1899, there was very little Plague, but it began to increase thereafter and reached its worst stage in the first week of April 1900. Since this it has been gradually declining. As in last year, so in this, the Plague started in Mahomed Khan Pakhadi amongst the low-caste Hindus, gradually spreading thence over the whole section. This locality is well-known to be the most insanitary portion of these sections. A few dead rats were met with in the course of disinfection work, but nothing remarkable has been experienced through them in these sections. All the localities attacked last year were re-infected and attacked this year, as also the communities inhabiting them, but Mahomed Khan Pakhadi was the central spot from which re-infection was spread.

This year is noticeably different from previous epidemics, since there was no panic, no flight of numbers of people, though the total mortality has been greater than any previous years. The poor were again the heaviest sufferers, and famine-refugees added considerably to the mortality, the number of road-side cases exceeded those of former years, and they were almost all destitute beggars. In order to aid the attempts that were made to send these refugees back to their country, house-owners were told not to receive them in their houses. Five or six deaths monthly used to occur in those houses, where the beggars lived by hiring by mutual subscription.

In 2nd Nagpada, the epidemic commenced in the middle of December 1899, and attained its highest form on the 15th March 1900. Since then there has been a gradual decline. Dead rats were found to some extent in November and December 1899, in Kazipura and Duncan Road. These localities were the worst places in last year's epidemic and so again in the present year. But if large numbers had not been inoculated the deaths from Plague would have been far more numerous. Captain Bolton reports in No. 158, Huzria Mohalla, inhabitants all Mahomedans, uninoculated, there were 7 cases discovered in one day on the top floor. The Municipal hose was used to disinfect the house from top to bottom, and since then there has not been a single case of Plague, though this is an extremely insanitary locality where Plague has recurred every year.

The Plague started in Kazipura, then went to 177 Grant Road, and then to Duncan Road, all mostly inhabited by the poorer classes of Hindus. These people, however, got themselves inoculated in large numbers, and the result was that deaths from Plague became most frequent among Mahomedans and new-comers. In this respect the year under report differs from others.

It is strange to notice that the Jews living in Bellasis Road seem to be immune from Plague, for they have not come forward to be inoculated and there have been very few deaths from Plague amongst them. Meanwhile Hindoos living in the same road were severely attacked not only from Plague but Small-pox. In this section also there was a considerable influx of refugees.

In Khara Talao and Bhuleshwar the Plague was quiescent until November, and, gradually increasing, reached its zenith in the week ending 17th March up to the middle of April. Here again this year as in last, the centres of infection were parts of Duncan Road, Ghogari Mohalla and Ali Umar Street. The classes that suffered most were in Khara Talao Hindus, as Lieut. Searle states, in the proportion of 29 out of 46, in Bhuleshwar Mahmomedans, 28 out of 37, due to the fact that most of the latter were inoculated, and only new-comers and famine refugees and Mahomedans, regular inhabitants of these parts, being uninoculated, suffered most.

Those who suffered least in Khara Talao were Borahs, living mostly in good houses, and some numbers of these had taken to inoculation. Those who suffered least in Bhuleshwar were the Mochis, all of whom were inoculated this year, a contrast to previous years, when they were the worst sufferers.

As regards reinfection most of the localities attacked last year suffered again this year; but Lieut. Searle states, after careful enquiry, that reinfection, after vaccination and disinfection, seldom if ever takes place. His opinion is that if Plague breaks out it must have been an imported case. The deaths have been larger in number this year from Plague as compared with last year, and this is due to the number of famine refugees and beggars.

In Byculla Plague commenced in epidemic form in the beginning of December 1899. The localities attacked were the same as last year: Ripon Road east side, and Agripada, also Moreland Road stone chawls Nos. 42A to 49 successively. Hindus, lower caste, and Mahomedan Julahas suffered most. The section was early filled with famine refugees. The highest mortality occurred in the week ending 17th March 1900 and up to the beginning of April 1900. The epidemic this year was different to the past year in Byculla, the mortality from Plague and all causes being greater, and this is probably due to the number of emaciated famine refugees. Road-side cases were equally due to Plague and to ordinary causes. Numbers of these destitute people as well as ordinary inhabitants of the place were inoculated, which must have limited the number that might otherwise have succumbed to Plague.

Small-Pox.—All parts of the District were infected; the people seemed quite indifferent to the disease, as usual. Often persons suffering were met going about the streets as if there was nothing to trouble about, because the disease is considered a sacred one and treated as such, by burning lamps and candles, and offering incense to the patient. There was a difficulty to find room in Hospitals for the patients.

In writing their reports District Officers have had no uniform standard to guide them in deciding what constitutes an epidemic; the following table is drawn up from the weekly returns of plague and suspicious deaths, and is based on the entirely arbitrary but uniform hypothesis that a death-rate of 14 per mille per annum may be taken to confer upon the disease the notoriety of epidemic dimensions. From this point of view it appears that Plague was epidemic in Byculla throughout the year; in Kamatipura from the middle of July to the end of the year; in Dongri from the beginning of August to the end of the

year. In Kharatalao and 2nd Nagpada from the beginning of November to the end of the year. Kharatalao had also a slight recrudescence in the early part of October. In Fort and Esplanade from the middle of November to the 1st week in May.

In Bhuleshwar, Tardeo, 1st Nagpada and Parel from the middle of November to the end of the year.

In Colaba, Mandvi, Chukla and Umarghari from the beginning of December to the end of the year ; Mandvi also had a recrudescence from the middle of August to the middle of October.

In Dhobitalao, Fanaswadi, Girgaum and Mazagaun from the middle of December to the end of April.

In Market, Kumbharwada, Khetwadi, Mahalaxmi, Sewri, Mahim, and Worli from the middle of December to the end of the year. Kumbharwada also had a slight recrudescence in October.

In Tarwari from the end of December to the middle of May.

In Chowpatti and Sion from the beginning of January to the end of April.

In Walkeshwar from the end of January to the middle of May.

The effects of famine naturally reduced the standard of living of the poorer classes of Bombay, they were enhanced by many of the cotton mills closing or working short time. In addition Bombay was flooded with crowds of famine refugees from Kathiawar and elsewhere; they arrived debilitated and destitute, and wandered about homeless begging a living. Some 8,000 of these people were turned out of Bombay in one day and sent under the orders of Government to Thana. They did not contribute much to the Plague mortality, as the greater proportion of them were inoculated, but there can be no doubt they fell a ready prey to small-pox, relapsing fever and disease of all kinds. The number of road-side deaths in the City was very large and chiefly occurred among these immigrants. The poorer portion of the resident population were in like manner more liable than usual to the attacks of all forms of disease, and District Officers ascribe the comparatively high infant mortality of the year to the effects of famine.

Among other immigrants some 400 of the Khoja community were maintained from the Jemayet Funds and accommodated at the Hassanabad compound belonging to H. H. The Aga Khan. The arrangement was not an altogether satisfactory one, as this place is at certain times frequented by large numbers of Khojas, and there was a risk that if any disease broke out among the refugees it might be spread all over the City. They were, however, kept under medical supervision, most of them were inoculated, and though there was some mortality among them, they escaped any serious epidemic.

**General
Remarks.
Rats.**

The year's experience has thrown no new light upon the ways of Plague. Regarding rats the District Officer, A. Ward, Captain Lock, writes :—

During the period extending over August to April there were two distinct visitations of Rat-Plague mortality. The first in August 1899 extended to September, the second in February 1900 continuing to May 1900. During the intervening periods many dead rats were found and more heard of, but not by any means in so marked a manner as during the times referred to. It may be mentioned that during the latter part of the year a great crusade was carried on in this district against rats and, under instructions, was discontinued in December 1900. Men were employed with cages and bait ; poison was freely put down ; every help was given to private persons to clear out rat-infested quarters. Whatever the cause, rats were very little in evidence during the months of October, November, December and January as regards mortality. The mortality of rats marked distinctly the beginnings of the epidemic, first in the Fort Section and again in Fort South when attacked for the first time during the epidemic, to any great extent. It is beyond contention that rats are a serious cause of infection. The history of nearly all cases among human beings has proved a close connection with previous mortality among the rats.

It is worth recording that on the 28th September Captain Lock found no less than 79 dead rats in turning out a small shop in Colaba Village.

Lieutenant Dalglish in B. Ward, North, noticed that the number of rats killed varied inversely as the mortality among human beings ; information was not often given him about the finding of dead rats, and when it was, he had to make careful enquiries, as the information was often falsely given in order to secure for an enemy the discomforts of disinfection. Except in the case of Europeans resident on the hills the District Officer, D. Ward, found the same reticence about dead rats. Out of 102 cases of Plague on Malabar and Cumballa Hills no less than 62 were preceded by the discovery of dead rats. In E. Ward West the mortality among rats was exceptionally heavy at the beginning of March when Plague was at its worst.

Captain Walling writes of Wari Bundar :—

Rats did not play such an important part this year as they did last ; but I can give a few instances of their being found dead before human beings were attacked.

- I. In a kitchen in Hamilton's Hotel, Mazagaum Road, 4 dead rats were found ; the following week 4 of the servants occupying the rooms were attacked. On a dead rat being found in the bungalow itself, following on the cases the bungalow was vacated. Last year dead rats were found in the same bungalow.
- II. A house at the entrance of Muzawarpacady Cross Lane. This resulted in the death of a servant and 3 other occupants of the house. The time that elapsed between the finding of the dead rat and the first attack is not definitely known, but was about 6 days.
- III. In Lion's Den, Matarpacady, occupied by respectable Parsis, 2 dead rats were found. About 15 days after one female member was attacked and died 5 days after at Matheran where she had gone.
- IV. In No. 64 Copper Smith St. 3 dead rats were found in a store-room on the ground floor. In this case the occupants of the house escaped infection, but 2 cases within a week after occurred in a house exactly opposite. The road is a narrow one and the entrance of the storeroom opened on to the road. No dead rats were, however, found in the latter house.

Very few rats were found in Byculla, though they were carefully watched for. Captain Wooldridge cites one case—house No. 196 Haines Road—where a tenant was seen throwing out 2 dead rats, and on the following day a suffering case was found next door. This was on the 11th March, and between that date and 5th April 9 suffering cases were removed. The outbreak was stopped by evacuation and disinfection.

**Liability
to the
Disease.**

The majority of District Officers hold the opinion that it is the localities that are attacked and not any particular class of the people. Insanitary and over-crowded areas are more liable to the disease than others, and naturally the lower classes, who inhabit such places, are the worst sufferers.

Captain Lock notices that Plague was much more localised than in previous years, many places that had been severely hit before having entirely escaped infection during the year under report. He ascribes this in part to the greater care and cleanliness of the people, partly to the extreme thoroughness of disinfection on the slightest suspicion of Plague, and partly to the wholesale inoculation of the residents of some of the worst quarters.

Lt. Dalgliesh gives as an instance of the persistency with which the disease sticks to certain buildings—house No. 182 II, Nowroji Hill, North, in which 5 cases of Plague occurred, between 5th May 1899, and 12th May 1899. House was vacated, disinfected and re-occupied 10 days after, the residents having been sent to camp. The house then remained free till 29th September 1899, when a suspicious death occurred and four suspicious cases, from 26th January 1900 to 11th March 1900, and then two cases of Plague on 13th March 1900 and 1st April 1900. This house remained free for four months after vacation and disinfection, after which Plague broke out again.

Captain Cuppage mentions two large chawls in Fanaswadi—Patras chawl and Batliwala's chawl—where attention to sanitation seems to have conferred immunity. They were both badly infected last year, but since then had been almost entirely renovated and reconstructed on sound sanitary principles, free admission of light and air being one of the chief improvements. The result was that in both localities there was comparatively little Plague, though the houses were occupied by Goanese, crowded into clubs, and the lowest class of Mhars. Captain Dunbar Stuart reports that in D. Ward the localities attacked were almost invariably the same as in the previous year and in some cases even the identical rooms.

Captain Boileau writes with regard to the reinfection of localities:—

Plague did not remain in any place in particular, but moved erratically all over the district, from one place to another, and often back again to the same locality whence it started ; but as a rule I find that once a house has been thoroughly disinfected, Plague does not visit it again *that* year, although it is almost certain to do so during the *next* epidemic.

CHAPTER III.

Measures Adopted.

The following statement shows how information of Plague cases was obtained during the year. The total does not tally accurately with the table of Plague cases given at page 5, some district officers having apparently included suspicious cases and others not. But the figures are sufficiently accurate for the purposes for which they are intended :—

The Discovery of Plague cases.

	A. WARD.			B. SOUTH.			B. NORTH.			C. WARD.			D. WARD.			E. WEST.			BYCULLA.			WARI BUNDER.			F. & G.			CENTRAL.			GRAND TOTAL.			
	Cases.	Deaths.	Total.	Cases.	Deaths.	Total.	Cases.	Deaths.	Total.	Cases.	Deaths.	Total.	Cases.	Deaths.	Total.	Cases.	Deaths.	Total.	Cases.	Deaths.	Total.	Cases.	Deaths.	Total.	Cases.	Deaths.	Total.	Cases.	Deaths.	Total.				
Volunteers ...	219	30	249	255	5	260	240	72	312	565	290	855	110	91	201	782	9	791	110	457	567	75	58	133	197	235	432	622	462	1084	3175	1709	4884	
Hospital Returns ...	131	1	132	261	...	261	78	9	87	506	3	509	194	...	194	100	...	100	1	336	337	48	22	70	63	127	190	81	23	104	1463	521	1984	
Lunatic Asylum ...	5	1	6	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	5	1	6
Private Practitioners ...	74	10	84	79	2	81	23	2	25	65	21	86	38	5	43	28	...	28	5	...	5	23	1	24	30	11	41	14	1	15	379	53	432	
S. M. Os. and Staff ...	140	209	349	41	8	49	162	369	531	220	1189	1409	243	488	731	72	...	72	99	...	99	101	139	240	735	889	1624	565	1164	1729	3378	4455	6833	
Registration Ramosels ...	7	5	12	48	300	348	49	24	73	81	350	431	41	186	227	29	898	927	182	977	1159	205	263	468	264	290	554	91	115	206	997	3408	4405	
Municipal Subordinates	12	14	26	5	1	6	4	...	4	7	10	17	1	1	2	12	17	29	41	43	84
Police ...	27	103	130	2	4	6	...	1	1	26	32	58	11	15	26	2	...	2	3	5	8	...	...	...	4	2	6	2	1	3	77	163	240
Military Authorities ...	35	7	42	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	35	7	42
Landlords ...	23	1	23	12	1	13	13	...	12	28	8	36	68	12	80	2	...	2	30	2	32	7	...	7	32	6	38	13	...	13	226	30	256	
Friends and Neighbours	80	19	99	124	15	139	15	...	15	66	15	81	13	8	21	6	...	6	68	...	68	1	1	2	10	...	10	...	19	...	19	402	58	460
Cemetery Memos. ...	...	75	75	...	...	...	...	2	2	...	148	148	...	24	24	...	...	...	...	...	...	...	2	2	...	46	46	...	7	7	...	304	304
Total ...	752	475	1227	827	336	1163	583	479	1062	1564	2066	3630	719	830	1549	1021	907	1928	498	1777	2275	460	486	946	1347	1623	2970	1407	1773	3180	9178	10762	19930	

The information supplied by volunteers, private practitioners, friends and neighbours and landlords is of the most useful character. From all these sources information comes, in by far the larger number of cases, before the patient's death, and it is possible to carry out all the necessary measures efficiently. Volunteers obtain their information partly from their acquaintances and partly in the course of house-to-house visitation; and it will be seen that they succeeded in reporting about $\frac{1}{4}$ the cases detected during the year; the number reported by the other agencies above referred to being very small.

The work of volunteers was most exceptionally good in this respect in E Ward West, and it was good in B Ward North and the Central District, it was also very good in Byculla, considering the very small number of gentlemen working. In A Ward, B South and C it was fair; but it must be mentioned that a very large proportion of the cases reported in B Ward South came from a single volunteer. C Ward has been disappointing: it held a leading place for the energy and zeal of the Committees last year, but there was a great falling off in the proportion of cases reported by them during the year under report; and, though every endeavour was made to induce them to bestir themselves, practically the whole of the work was done by the comparatively small body who have received honourable mention at the close of the chapter on Volunteers.

The work of volunteers as a whole in D Ward continued to be distinctly inferior. The number of cases reported from this source in Wari Bunder and F and G Wards was very small, but the volunteers dealing with these areas are comparatively few. In A Ward and B Ward South the comparatively large number of cases reported by friends and neighbours must be taken as an indication partly of confidence in the District Officers and partly of enlightenment among the people. The comparatively large number of cases reported by the landlords in D Ward is worthy of note. The assistance rendered by private medical practitioners was most conspicuous in A Ward and B Ward South, and after them in C and D Wards. There is nothing surprising in this, as these are the most advanced and well-to-do districts in Bombay. It is the duty of private practitioners to report all Plague cases that may come within their knowledge to the Health Officer, and the following statement shows the number of cases so reported by various doctors:—

Name of Doctor.	No. of cases reported by each.	Name of Doctor.	No. of cases reported by each.
Dr. E. F. Underwood	19	Dr. F. N. Bisni	4
Mrs. F. Murzban, M. D.	1	„ K. S. Engineer	2
Dr. C. H. F. Underwood	5	„ Bhalchandra Krishna	1
„ T. Blancy	14	„ G. B. Kher	2
„ N. A. DeSilva	10	„ R. R. Lakhdhir	8
„ M. Bradley	1	„ Khaja Abdulla... ..	25
„ V. K. Parulkar	5	„ Nagindas M.	1
„ Dinsha Bamanji Master	1	„ Hakim Ram Narayen	4

Name of Doctor	No. of cases reported by each.	Name of Doctor.	No. of cases reported by each.
Dr. Sorab Nariman	11	An informant signed D. E. L. ...	6
„ D. Katrak	1	Dr. Dossabhoj K. Patel	2
„ S. S. Batliwala	5	Col. G. Waters	2
„ S. K. Dadachanji	1	Dr. Temulji Bhikaji Nariman ...	1
„ J. I. De Quadros	3	„ E. J. Treasurywalla	1
„ L. B. Dhargalker	3	„ H. J. Dadishett	14
Major Crimmin, Port H. O. ...	2	Major J. P. Barry, I.M.S....	2
Dr. Dadabhai N. Saher	2	Lt. Twigg, I.M.S....	1
„ J. K. Daji	2	Capt. Brogden, R.A.M.C....	1
„ Hurjibhoj J. Apoo	2	Dr. H. W. B. Prescott	1
„ C. Rodrigues	3	„ L. P. Gomes	11
„ A. A. Gair	1	„ Navazbai M. Metha	1
„ Edulji Nusserwanji	1	„ F. B. Seervai	1
„ S. B. Jatar	4	„ J. Nicholson	1

But a considerable number of medical practitioners habitually gave information direct to the District Officers, and the following names, not included in the above list, are mentioned by them:—

Dr. Viegas, Dr. Ismail Jan Mahomed, Dr. D. B. Naik, Dr. (Mrs.) Nadirshaw, Dr. Rozario, Dr. Narielwala, Dr. Erachshah Hakim, Vaid Erapa, Dr. F. X. Fereira, Dr. P. J. deSouza, Dr. Purshotam Harichand, Dr. S. S. Misir, Dr. B. D. Kapadia, Dr. Popat Parbhuram, Dr. Ranina, Dr. Moses and others.

In some 7 cases during the course of the year serious occasion arose to suspect medical practitioners of deliberately neglecting their legal obligation of reporting Plague cases. Two of these cases were taken into Court and convictions obtained; in another case the doctor concerned apologised and promised amendment, in the other 4 cases there was insufficient evidence to warrant legal proceedings. Only two of the 7 above referred to were qualified men. Information derived from hospitals is in a way satisfactory; it may be observed that as many as 10 per cent. of the total number of Plague cases detected were voluntary removals to hospital. The disadvantages attached to this form of information are first that the patients or their friends and relatives give as often as not most vague and unsatisfactory addresses, and secondly that even when the house, where the patient fell sick is found, the contacts have frequently removed themselves elsewhere, taking all their belongings with them undisinfected, and probably causing danger to other people. The proportion of voluntary removals in B Ward South was noticeably high. Information supplied by the Lunatic Asylum and by the Military, refers entirely to A Ward, where the asylum is situated and the troops are quartered. The detection of Plague amongst the troops and their followers was entrusted to the Military, and the work was most efficiently performed.

It will be seen that the sectional medical officers and staff, together with the registration ramosis, discovered more than half the Plague cases by their own efforts, but less than a third of the cases they found were detected before the death of the patient. In D Ward, Wari Bandar, and F and G Wards this work weighed heavily upon the staff, principally owing to the lack of energy in the volunteers of D Ward and

their scanty numbers in the other two districts. In Wari Bandar and F and G Wards the staff were more successful than elsewhere in detecting cases at their earlier stages, while in C Ward and E Ward West they were distinctly unsuccessful in this respect.

The number of cases reported by the Police and subordinates of the Health and other Municipal departments was very trifling, the comparatively high number of cases reported by the Police in A Ward was probably due to roadside cases among destitute people who slept on the open maidans of that district. A very satisfactory feature of the table is the small number of cases detected through the means of reports from the cemeteries. This method of obtaining information is both inaccurate and tardy, and only came into operation when every other agency had missed the case.

Reference was made in last year's report to the institution of an uniformed corps of ramosis to improve the registration of deaths. The cemetery returns showed formerly that the administration was entirely unable to trace something like 20 per cent. of the deaths that occurred : and in these cases it was impossible not only to take any sanitary action, but even to make enquiries as to whether any action was necessary. The registration ramosis are assigned beats throughout the City, and it is their business to see that no dead body is removed from their beats without a pass. A duplicate of the pass is made over by the ramosi to the sectional Medical Officer, and the original is handed by the funeral party to the clerk at the cemetery. At the three principal cemeteries arrangements were further made that if a dead body was brought for disposal without a pass, a messenger should be sent back with the party to verify the address.

The system succeeded almost beyond expectation, the people have fallen into it readily, the ramosis have missed but a small proportion of funerals and those principally still-born infants, and very young children, who are carried in the arms to the cemeteries without much ceremony. The majority of deaths missed by the ramosis have been verified by the cemetery messengers, and from the beginning of November to the end of May the proportion of deaths, in which the district staff failed to find the address, was reduced to 3.58 per cent.

In addition to being very much more accurate, the information was very much more prompt, and, speaking generally, when the list of deaths for the day was received from the Health Department in the various districts, nearly all the deaths in the list had already been enquired into, in consequence of information received from the registration ramosis. The registration ramosis in some parts of the City also gave valuable information as to plague and other sickness, and they were of the greatest use to the district staff in carrying out the various measures adopted.

The following Circular initiated the system of registration ramosis:—

It is intended to abolish the present system of collecting information of deaths systematically through the police.

At present the police, who are, as a body, unable to read or write, issue tickets to funeral parties, and then give the information regarding the address to the recording officers who simply write it down and pass it on to the District Officers. The Police Agency will be replaced by a corps of ramosi, who can read and write. These men will be directly under the District Officer. They will be on day and night duty. They will have allotted beats. To each beat 2 men will be posted, who will relieve one another every 8 hours. For the sake of uniformity the hours of relief should be 6 a.m., 2 p.m. and 10 p.m. To each beat there will be one book of death certificate memos. in foil and counterfoil, and this will be passed on from the relieved to the relieving ramosi.

The primary duty of the ramosi will be to patrol his beats and to see that no funeral party starts from it, without a death certificate memo., which he will himself write out and hand to a member of the party *after* verification of the address.

It will be as well to hold the two men on duty on each beat jointly responsible for any failure unless the blame can be clearly fixed.

The book of certificates must always be in the hands of the ramosi on duty, and the ramosi on duty must never leave his beat, except to verify an address or to communicate with the District Staff.

This is most important, because after the system is properly understood by the people they will habitually look to the ramosi for the certificate, and if he is not to be found great public inconvenience will be felt and the scheme must fail.

It will, however, be necessary for the sectional Medical Officer to arrange to meet all the registration ramosi under his orders once in the morning and once in the afternoon before he starts on his rounds ; and for this purpose a time should be fixed and a meeting-place arranged.

This place should be selected so as to constitute, so far as possible, a converging centre for the beats of the various ramosi, and where possible it should be a Plague or Municipal Office or Shelter.

This place might be fixed as the relieving place : and a book might be kept there in which the ramosi should enter the time of his coming on and off duty.

It is hardly necessary to emphasize the following points, they are of vital importance :—

1. A funeral must never be forcibly stopped.
2. Any oppression on the part of the ramosi must be vigilantly guarded against and promptly and severely dealt with.
3. The certificates are only certificates of the address of the deceased, they have nothing to do with the cause of death, which it will remain the duty of the Medical Officer to ascertain by personal enquiry at the house.

The secondary duty of the ramosi will be to keep themselves and the Medical Officers informed of all sickness in their beats, and it is possible that to men who perform this duty well a small reward may occasionally be offered.

Their beats should at once be fixed and they should be carefully drilled in their duties. They should be placed upon their beats, made to learn the locality thoroughly, and instructed to ascertain and report to the Sectional Medical Officer (who should at once, under the orders of the District Officer, select a meeting-place) all sickness and death.

The men sent must be arranged so as to cover the whole district day and night. As soon as the men are, in the opinion of the District Officer, sufficiently instructed, he will issue to them certificate books. These books should be obtained at once

from the Chief Accountant. They are printed in triplicate, but the triplicate is not wanted, and should be torn off leaving only foil and counterfoil.

On each foil and counterfoil should be written the letter of the Ward of the city, and the name of the section in which the beat lies.

The District Officer should inform me 2 days before he intends to issue these books in order that I may ask the Police Commissioner to recall the ticket books now in the hands of Police Constables, who will then cease to give tickets to funeral parties.

District Officers should also report how the beats are arranged, and what meeting-places are fixed.

This system of ramosis reduced the number of deaths that could not be traced to a very small proportion of the total mortality ; the Sectional Medical Officers had to make personal enquiries regarding the cause of every death, and had every week to submit returns, showing the method of their verification of the deaths they put down to causes other than Plague or suspicious. If the death had occurred in hospital there was comparatively little doubt about the correctness of the diagnosis ; and so too if the Sectional Medical Officer had seen the patient during his last illness, or examined the body after death. Medical certificates from qualified practitioners were ordinarily accepted, and sometimes from unqualified practitioners of good repute. There were a few other satisfactory sources of information ; *e.g.*, deaths certified by the Coroner, and deaths in the Lunatic or Leper Asylum, &c. The balance of deaths put down to ordinary causes which were verified only by enquiry from friends and neighbours, it was the constant object of the Deputy Commissioner to reduce to the lowest possible figure. If there were many the Sectional Medical Officer was warned to be stricter in his enquiries, and to be more careful about accepting the statements of other residents in the house, and was persistently impressed with the necessity of treating as suspicious all deaths about which there could be the least possible doubt, and thereby securing at least the advantages of disinfection. The results of this continual pressure are given in the section referring to the mortality of the city at page 12 of this report.

Removal of Patients to Hospital.

Removal of patients to hospital is thoroughly unpopular and is no doubt the principal reason why Plague is concealed. A considerable number, however, do go voluntarily. When a suffering case is found the people now, as a rule, accept the necessity of removal though generally with reluctance.

The statement of work done shows that of 9,127 suffering cases found 8,144 were removed to hospital and 983 left at home. Of those left at home a few were Health Department biggaries who were looked after by their own department ; the number isolated by District Officers, in the exercise of their discretion, was 159, and the whole of the rest were moribund cases.

Isolation was only permitted in airy well-ventilated rooms, the rest of the house was, so far as possible, kept empty, the number of attendants was limited, medical attendance was insisted upon, visitors prohibited, sanitary precautions enjoined, and disinfectants provided. The District

Officers and their Medical Officers did their best by daily visits to see that these conditions were fulfilled. In some they were, but in many not.

The results of the cases have not been given by all District Officers, but in four districts, out of 66 isolated 38 recovered—a high percentage. It would be unsafe to base conclusions upon such small numbers, and in addition it must be remembered that the conditions of isolation excluded all but fairly well-to-do people, whose constitutions are probably better able to resist the disease; they always had medical attendance and frequently skilful nursing.

A few cases of Plague have occurred among the attendants upon isolated cases during the year, but it would be difficult to say whether they took the disease from the patient they were nursing or from the same source as the patient. Obviously by remaining under the same conditions under which the original patient was attacked, they were liable to attack themselves, and this danger would have been minimised if the original patient had been at once sent to hospital and themselves to camp. Experience indicates that the danger of infection is very much greater in pneumonic cases.

The District Officers generally consider that isolation at home gives the patient but a poor chance, and there is a unanimous opinion that it should at least be confined to the more enlightened and better educated.

Captain Lock writes:—

“After nearly 3 years’ experience of Plague in Poona, Bombay and Surat, I am convinced that it is a mistaken kindness to permit a patient to be treated at home. Except in cases of European patients or patients nursed by European trained nurses, there has in my experience been only one result—the death of the patient.”

Captain Boileau writes:—

“The character of the people is such that, no matter what class, they will always do the best they can for the patient they are tending and, without reference to Doctor’s orders will, out of pure kindness of heart, and foolishness, give the patient just whatever he asks for and generally succeed in killing him. A notable instance of this actually occurred in the Sarvajanic Hospital, where the Hospital Assistant got Plague and Pneumonia. He treated himself and also allowed Col. Wilkins and Dr. Hunt to treat him. The bubo was opened and the man was doing fairly well when cellulitis set in, and his leg became much inflamed. This Dr. Hunt prescribed for and the lady nurse by careful watching was just making a good recovery of the case, when a friend stepped in and administered some native drug for the purpose of relieving the patient’s urinary organs. Some of this drug evidently drained into the wound caused by opening the bubo, and blood poisoning set in from which the man died the same night.”

“Here is a case where the man was more or less under hospital supervision. How much less chance would he have had under outside treatment. The treatment of private practitioners also in my opinion leaves much to be desired, and very few cases recover, the reason being probably that the medical man sees the patient morning and evening and for the rest of the day he is left to the tender mercies of his

utterly ignorant relatives. In Mahim Hospital there were children of 6, 7, and 8 years with 5 and 6 buboes on them who recovered. What possible chance could they have had at home."

**Segregation
of Contacts.**

The object of sending contacts to camp is, as explained last year, partly to get people out of infected rooms, and partly to prevent the risk of their infecting others. It is an unpopular measure; the contacts do not greatly object to leaving the room, but they do not like going to camp. Where a suffering case was found, the family would go off to the camps attached to the principal hospitals without much difficulty, but where the patient was already dead, it often took endless time and trouble to trace the contacts, and frequently they could not be found at all. Among the lower classes is to be found a large fluctuating population with few belongings, who come to Bombay for work, and share a room as sub-tenants. In such cases especially it was exceedingly difficult to find the sub-tenants. Once the contacts were found there was practically no difficulty in getting them to go to camps, except among the Mussalmans who consistently object to all interference.

As a general rule the people were happy enough when they got to camp, and often wished to stay on there; but a certain number of cases occurred, more especially among those sent from F and G Wards, who had to go a considerable distance to camp, where they quietly left the camp and disappeared. This was to some extent prevented by making a point of sending as much of their kit as possible to camp and prohibiting its removal till the expiry of the 10 days period, but sometimes hardly any kit could be found to send, and sometimes the people would just leave their kit and go. In a few cases they were traced and sent back. Among the higher classes great good was done by the various private camps. The members of the various communities were quite aware of the danger of staying in their infected quarters and perfectly content to go to their own private camps. In the General Statement of work done the number of contacts dealt with is given. It will be seen that as compared with the total number of Plague cases, the work was a good deal more efficient than in the previous year; and when the very large number of contacts, who were not interfered with because they were inoculated, is taken into consideration, the improvement is very marked.

**Evacuation of
infected
houses and
localities.**

There is very little new to be written on the subject of the evacuation of infected houses and localities. This operation, which involves a more extensive interference with the people than any other, is the one that causes least trouble. The reason, no doubt, is that considerable discretion is used in adopting it; the people have generally become anxious for their safety, and everything possible is done for the comfort and convenience of those removed. The services of volunteers were invaluable in this work. The number of people sent to camp would have been greater but for the fact that inoculation was so freely offered and accepted as an alternative for segregation.

Theoretically when it had been decided to evacuate a house, only persons who were inoculated should have been allowed to remain, but

as a matter of fact it was impossible to carry this out strictly. In the first place a number of the inmates would almost certainly be absent at the time of inoculation, and in the second place it was an almost invariable request that at least one member of the family might be exempted from inoculation to look after and cook for the rest, while they were down with fever. There were also a certain number of weaklings and the extremely old and extremely young, whom it was not considered advisable to inoculate. To have sent these to camp by themselves would have been impossible.

Captain Cuppage writes on the subject as follows :—

“ In deciding whether an infected house or chawl has to be partly or wholly vacated, so many varying circumstances have to be taken into consideration and weighed on their merits, such as the past or present Plague history of the house or chawl, the nature of its inhabitants,—particularly the cleanliness or otherwise of their habits,—its construction from a sanitary point of view, the virulence of the epidemic, the sanitary condition of the dwellings in its immediate neighbourhood, the number of people residing in it, &c., that it is not easy to lay down fixed rules. As a general rule, however, I insisted on partial if not total evacuation of a building in which there had been, within a short space of time, three or more deaths of such a suspicious nature as justified me in attributing them to Plague. There were a few instances in which houses were vacated wholly, though only one or two deaths of a suspicious nature had been discovered in them, but the circumstances under which this was done were very exceptional. During the latter portion of the epidemic Kolbhatwadi, part of the Dhobi Talao section, off Kalbadevi Road, became very highly infected. The houses are miserable hovels, densely packed together and overcrowded to an incredible degree. Moreover, they are tenanted by poor people, whose habits are not of the cleanest. I evacuated houses wholesale in this locality, and in one case there had been only one death of a suspicious kind ; but as the house adjoined another in which there had been several deaths, I deemed it advisable to vacate it. The people made no opposition whatever. I am happy to say the results were highly satisfactory. Upwards of 6 to 700 people were moved out of a highly infected area and kept for a month to six weeks in the health camp. I venture to think my action, in this particular case, was instrumental in saving many lives. The landlords, of course, raised an objection, but I reasoned with them.”

“ On the whole, evacuation of infected houses has not been carried out to the same extent that it was during the last epidemic. I had considerable difficulty in inducing some Parsis to leave a house in Dhunji Street which had had only two suspicious cases. Thanks to Khan Bahadur Fakirji Jiwaji and Dr. Bomanji Master’s assistance, they acted upon my advice. Dhunji Street though, strange to say, comparatively free this year, had a very bad history last epidemic, and, knowing how rapidly it spreads once it takes a hold of this locality, I departed from what I had laid down as a general rule for such cases. Difficulty was also experienced with the Mahomedans in Islampura, but thanks to Lieutenant Browne’s firmness, combined with tact, there was no serious disturbance of any kind. Liberal concessions were made with regard to evacuation of infected houses, the inhabitants of which submitted to inoculation, and as a greater part of the inoculations performed in Kumbarwada were confined to contacts and people who would otherwise have become evicts, it was chiefly due to inoculation that evacuation of houses was carried out on a much smaller scale during the last epidemic in Kumbarwada.”

Captain Lock found his principal difficulty with the *bhayas* and landlords, who were anxious about their rent. He got over it by

taking as much trouble to put the people back in the same houses as he had taken in removing them to camp. The following example of the patience of the people is taken from Captain Dunbar Stuart's report:—

“To show how marvellously they do take things, one morning I evacuated a chawl, and sent 60 of them off: the Sectional Medical Officer, through some misunderstanding, sent them to Chowpaty Camp. This was not open at the time, but some huts were erected, the people quietly dumped their things down, so I had to send for them again, they again packed up, sat on the carts and were marched off to Charni Road Camp, where they eventually arrived sometime in the afternoon, not a murmur nor a complaint did I get. They were started 8 A. M. and got in at 3 P. M.”

The following extracts from the reports of the District Officers, B Ward North, Byculla, and F and G Wards, respectively, show the high opinion held by those officers as to the value of evacuation as a Plague measure.

Lieutenant Dalgliesh (B Ward North) writes:—

“Houses in which two or three cases of Plague occurred within a short time were, as a rule, vacated and the tenants sent to camp.

“Sometimes, if all the cases occurred on one floor, only that floor was vacated and the house was carefully watched for further developments. When a house had to be vacated the landlord was first interviewed, and in the majority of cases, was found to be willing to help the Plague measures by personally persuading the people to go to camp. This result was brought about by more or less lengthy explanations (by volunteer members chiefly, sometimes by the District Officer) of the benefits both landlord and tenants would derive from removal to segregation camp. Landlords knew that if very many cases of Plague occurred in their houses, they ran a good chance of the house being made U. H. H., which would entail a heavy loss of rent, while the house was being repaired, and renovated. They were thus more ready to give assistance to any measures which might stop the occurrence of fresh cases in their houses.

“Evacuation of infected houses and segregation of their inmates was found to be a very effectual way of stopping Plague, at any rate for a time, as the following instances, among many others, all tend to prove:—

“In No. 20-22, Umerkadi 2nd Row, a dirty dark house, in a very narrow lane, 8 cases of Plague occurred between 5th May 1899 and 29th December 1899. On the latter date 3 Plague cases were found concealed in rooms which were locked up. The whole house, which was a small one, contained only about 30 persons, was vacated, disinfected and the residents segregated in camp for 15 days, since when there has been no recurrence of Plague.

“House No. 26, Jail Road North, in which one Plague death occurred on 8th January 1900, and 2 on 10th January 1900, was vacated and subsequently marked U. H. H. by the Health Department. One case occurred in the adjoining house on the 7th January 1900, of which 10 contacts were sent to camp. No Plague occurred in this house since that date, which I put down to the fact that No. 26 next to it, which had a bad record previously, was vacated and not re-occupied.

“Another instance is No. 66-68, Umerkhadi Road, in which 25 deaths have occurred since 20th August 1899, including 7 deaths from Plague and 3 suspicious. Of these 3 Plague cases occurred on the 5th April 1900 and 6th April 1900. The house was vacated on 7th April 1900, since when there has been no more Plague. When a house was vacated landlords were requested to limewash the houses before the tenants returned, which they invariably do. Vacated houses were of course invariably disinfected.”

The following is taken from the report of Captain Wooldridge (Byculla):—

“ The following chawls were entirely evacuated :—

“ No. 39, Haines Road.—It is a small two-storied house with a loft ; there were two deaths and four removals between the 29th June and 6th July 1899, and the landlady agreed to vacate. It was cleared of all tenants for one month. Thoroughly disinfected and quick-lime-washed. There has been only one case since, *i.e.*, on the 5th May 1900, eleven clear months afterwards.

“ No. 82, DeLisle Road.—This house was attacked on the 12th June 1899, and before the 10th July 1899 had two deaths, and 9 removals. It was evacuated for one month, but the landlord would not quick-lime the whole of it. He promised to do so, and so I allowed the tenants to return, and after reoccupying it, he put ordinary lime-wash on. In March this year there were 2 deaths and 5 removals.

“ No. 52, De Lisle Road.—This is a row of 11 rooms standing on a good plinth with very small lofts, which are badly ventilated. The first death occurred on the 21st February 1900 and the same day there were 8 removals. The rooms were evacuated on the spot and remained so for one month. It has remained free of Plague since.

“ Inoculation has done away with the necessity of evacuation. Fourteen chawls were partly vacated only as the majority of the tenants preferred inoculation.”

Captain Boileau (F and G Wards) writes as follows :—

“ Wherever dead rats were reported, I have made it a rule in my ward to have the house vacated at once and thoroughly disinfected, and have found this method of procedure productive of the best effects.

“ In Naigaon and Bhoiwada the Volunteer Committee evacuated the whole section practically and those deaths which have been reported from the sections occurred entirely amongst those who were left behind and would not go to the fields. Jan Mahomed's chawl in Dadar Road was evacuated by a low class of Ghattis early in the season. These went to live in the camps, and amongst them the first case of Plague occurred in the camps. The chawl, however, which was very badly infected last year has had no Plague during the year under report. *Again* at Chota Sewri, one or 2 cases occurred, and Rao Bahadur V. Kimji at once caused the people to evacuate the place and go into the open fields ; but again in the open about 6 or 7 deaths occurred from Plague, and that was caused by an infection left there by throwing urine, and excreta and dead rats from the village. The people were again removed about 200 yards and no further cases occurred. In Mahim and Worli, at one time or another the whole subdivision was out in the fields and this no doubt tended to avert much of the Plague.

“ In Sion, Sewri, Waddala, and Bhandarwada, evacuation was carried on to a great extent and the effect was most marked. I am of opinion that evacuation is the most valuable agent we have for the stoppage of Plague in any affected locality. Had not this section been almost entirely in camp, the death-rate this year would have been alarmingly large, certainly more than double. There has been a general tendency all round in favour of evacuation, and people in most cases are only too glad to take to the fields.

“ It is most noticeable that in Parel and village, where evacuation could be least carried out, the Plague was most virulent. In the village where the people would neither have inoculation or evacuation until very late in the season, the disease fairly caught on ; and in Parel had it not been for the large number of inoculations, I am convinced that the number of deaths would have been very great.”

The following statement shows, district by district, and section by section, the amount of work done in the direction of removal of the sick, and the removal of contacts and evicted camp for the year ending 26th May 1900 :—

SECTION.	Population by Census of 1891.	No. of Plague Cases discovered.			No. of Patients removed to Hospital.	No. of persons sent to Hospitals or Camps as Contacts.	No. of persons segregated in private quarters other than authorized Hospital or camp.		No. of Persons sent to Camps as Evicts.	REMARKS.
		Attacks.	Deaths.	Total.			Patients.	Contacts.		
1	2	3	4	5	6	7	8	9	10	11
A Ward—										
Upper Colaba ...	4,335	63	15	78	61	57	2	5	75	
Middle & Lower Colaba...	13,622	220	161	381	212	1,071	8	15	1,445	
Fort Southern ...	3,951	40	11	51	39	114	1	...	402	
Fort Northern ...	32,847	331	189	520	301	1,279	30	99	718	
Esplanade ...	10,064	73	124	197	69	60	4	6	24	
		727	500	1,227	682	2,581	45	125	2,664	
B Ward, South—										
Mandvi ...	37,295	609	262	871	548	885	61	75	1,374	
Chukla (portion) ...	21,465	213	199	412	188	189	25	8	39	
		822	461	1,283	736	1,074	86	83	1,313	
B Ward, North—										
Umerkhadi (portion) ...	13,117	270	131	401	231	578	39	63	989	
Dongri ...	30,317	313	348	661	293	746	20	22	1,334	
		583	479	1,062	524	1,324	59	85	2,323	
C Ward—										
Market ...	44,751	528	503	1,031	484	2,712	44	...	4,175	
Dhobi Talao ...	39,945	282	405	687	255	1,798	27	6	2,578	
Fanaswadi ...	24,069	236	316	552	236	1,488	...	...	1,073	
Bhuleshwar (portion) ...	23,351	238	166	404	231	167	7	...	62	
Kumbharwada ...	32,209	284	654	938	281	1,400	3	...	1,124	
		1,568	2,044	3,612	1,487	7,565	81	6	9,012	
D Ward—										
Khetwadi ...	28,814	231	154	385	220	531	11	10	943	
Girgaum ...	26,999	161	319	480	161	452	...	...	866	
Chowpatti ...	11,512	74	105	179	74	118	...	...	120	
Walkeshwar ...	12,990	152	115	267	149	182	3	...	...
Mahaluxmi ...	17,014	104	139	243	102	327	2	...	262	
		722	832	1,554	706	1,660	16	10	2,191	
E Ward, West—										
Kamatipura ...	29,203	508	472	980	464	2,262	44	10	3,037	
Tardeo ...	18,980	312	249	561	286	1,124	26	...	1,714	
1st Nagpada ...	11,133	202	188	390	182	626	20	...	705	
		1,022	909	1,931	932	4,012	90	10	5,456	
E Ward, East, Byculla—										
Byculla (portion) ...	31,602	500	1,462	1,962	462	897	38	14	892	
		500	1,462	1,962	462	897	38	14	892	
F Ward, East, Wari Bunder										
Mazagon ...	33,640	125	269	394	115	297	10	68	370	
Tarwadi ...	21,298	327	215	542	265	854	62	63	1,506	
		452	484	936	380	1,151	72	131	1,876	
F & G Wards—										
Parel ...	28,740	450	445	895	446	608	4	249	542	
Sewri ...	6,063	222	403	625	193	253	29	230	3,705	
Sion ...	19,601	73	156	229	57	144	16	80	657	
Mahim ...	18,505	358	304	662	244	744	114	161	12	
Worlee ...	25,493	246	314	560	244	425	2	422	143	
		1,349	1,622	2,971	1,184	2,174	165	1,142	5,059	
Central District—										
Chukla (portion) ...	10,732	27	13	40	19	40	8	5	...	
Umerkhadi (portion) ...	39,349	232	102	334	215	497	17	88	918	
Bhuleshwar (portion) ...	15,012	147	415	562	80	760	67	184	129	
Khara Talao ...	27,035	283	596	879	200	1,185	83	447	661	
2nd Nagpada ...	18,768	473	428	901	323	1,311	150	1,712	1,280	
Byculla (portion) ...	15,801	220	194	414	214	1,104	6	136	3,204	
		1,382	1,748	3,130	1,051	4,897	331	2,572	6,192	
Total ...	...	9,127	10,541	19,668	8,144	27,335	983	4,178	36,978	
Total for the previous year ...	...	9,339	8,164	17,503	8,669	18,806	831	2,722	54,252	

Disinfection.

Perchloride of Mercury continued to be the disinfectant chiefly relied upon ; and its manufacture at a Central Laboratory remained under the supervision of Dr. C. H. Cayley, Capt. Howell, R. A. M. C., superintending the work, until Dr. Cayley's return from Europe. Subjoined is Dr. Cayley's report :—

" I have the honor to submit my report on the preparation of the Perchloride
" of Mercury solution during the year ending May 31st, 1900.

" The same method of preparing the disinfectant solution was adopted through-
" out the current year as was used last year. This method was described fully in
" last year's report.

" The concentrated solution prepared at Foras Road and issued to the districts,
" contains 10 per cent. of Perchloride of Mercury and 20 per cent. of Hydrochloric
" Acid. The diluted solution, as used in the districts, should have a theoretical
" strength of 1 in 760 of Perchloride of Mercury and 1 in 380 of Hydrochloric
" Acid.

" The diluted solution, as used in the districts, was tested on various occasions
" and in nearly every case the solutions used were well over the theoretical strength.

" A list is given of the result of the various analyses of the solutions.

" 1. Analyses. Made in November 1899.

" E. Ward, West	1 in 680.
" Central District... ..	1 ,, 1085.
" B. Ward, North... ..	1 ,, 1092.

" 2. Analyses. Made in January.

" E. Ward, West... ..	1 in 900.
" F. Ward	1 ,, 530.
" A. Ward	1 ,, 600.

" 3. Analyses made in January. The actual strengths of the
" solutions are not stated but they were all stronger than
" the theoretical strength of 1 in 760.

" A. Ward.

" B. Ward, South.

" Central District.

" F. Ward.

" G. Ward.

" 4. Analyses made in May.

" A. Ward	1 in 267.
" B. Ward, North	1 ,, 584.
" B. Ward, South	1 ,, 645.
" C. Ward, North	1 ,, 1075. }
" C. Ward, North	1 ,, 641. }
" E. Ward, West	1 ,, 552.
" Central District	1 ,, 549.
" E. Ward, East	1 ,, 685.
" C. Ward, South	1 ,, 591.
" E. Ward, East... ..	1 ,, 538.
" D. Ward	1 ,, 847.
" G. Ward	1 ,, 442.
" F. Ward	1 ,, 454.
" E. Ward, North	1 ,, 471.

“ The analyses made in November showed that the solutions used were under strength. An order was issued that it was better to use the solutions too strong than too weak. The analyses made since the date of that order show that in most cases this has been done even to excess.

“ The analyses of the first sample taken from C. Ward, North, in the month of May, was distinctly weak. It appears that the jar of concentrated solution, from which this sample had been prepared, had been kept in stock for some time before use. No doubt the solution had decomposed to some extent in this time, as a sample taken from the same Ward a few days later, prepared from a fresh jar, had a strength of 1 in 641.

“ The analyses generally speaking are very satisfactory and show the advantage of having one central place for the preparation of the disinfectant solution.

“ The Perchloride of Mercury was always tested before being used to prepare the solutions. It was found that the Perchloride from different makers varied considerably in purity. Tyrer & Co's. Perchloride was found to be the best, and that makers' Perchloride alone is now used.

“ The Hydrochloric Acid was always tested before use, for its general purity and freedom from Sulphuric Acid. No Sulphuric Acid was found in the jars supplied, but occasionally a jar had to be returned to the contractors, as it had been diluted with water. As a rule, however, the Acid was of very good quality.

“ 100 jars of solution were always kept ready prepared in stock so as to meet all calls. In the month of March there were so many indents for jars of the solution that for a few days this reserve stock could not be kept up to the full number, but we were always able to supply what was required, and in no case did we fail to supply the quantity of disinfectant indented for.

“ The numbers of jars supplied to the various districts each month varied from 191 in June 1899 to 1,192 in March 1900.

“ The different districts used very varying amounts of the disinfectant. E. Ward, West, used 1,553 jars in the year ; F. & G. Wards 1,255 jars ; C. Ward 780 jars ; and the other Wards lesser quantities ; D. Ward using 181 jars in the 12 months.

“ The large amount used by E. Ward, West, was due to the wholesale flushing of chawls and buildings adopted in that Ward.

“ A table is attached giving the number of jars issued to each district, month by month, and the total jars issued each month and in the year.

“ In the current year it will be seen that 6,763 jars were issued.

“ The actual number of jars prepared in the 12 months was 6,762, as at the beginning of the current year there were some jars in stock.

“ The amount of Perchloride of Mercury used was 7 tons 16 cwt. 1 quarter 15 lbs. 14½ ounces.

“ The amount of Hydrochloric Acid used was 3,383 gallons.

“ The staff employed in the preparation of the disinfectant consisted of the Medical Officer in charge, an European Inspector, a clerk, 3 coolies up to January 1900.

“ In January, as the work was increasing, an extra coolie was employed. In February 2 more coolies were employed.

“ In February I found that several of the staff were suffering from symptoms of mercurial poisoning. The symptoms were swollen spongy gums, aching pains in the limbs, a tendency to diarrhoea and general malaise. All the staff were suffering to some extent, but Ramchandra Darmajee and Chima Mahadeo were suffering the most. With the Deputy Commissioner’s sanction I allowed these men sick leave on full pay and employed the two extra coolies mentioned above. Every week I examined all the men employed and gave sick leave to those who still showed signs of mercurial poisoning. Ramchandra was on sick leave from February 11th to April 12th. Chima was employed to carry messages from February 13th to February 28th, and was given sick leave from March 1st to 14th and from April 6th to April 18th. Sumboo Arjoon was on sick leave during the whole of February on half pay. He was suffering from fever, but also had spongy gums, muscular tremors and aching pains in the shins. I had previously given orders that while pounding the crystals of Perchloride of Mercury, the men should keep cloths tied over their mouth and nose. I now supplemented these orders as follows:—

“ While pounding the Perchloride of Mercury, or while any of the Perchloride is exposed, all the men working are to have cloths tied round their noses and mouths. No one is to leave the shed without having thoroughly washed his hands, cloths used for tying round faces to be well washed after use and hung up to dry.

“ A mouth-wash of Chloride of Potash is provided. Everyone working in the shed must use this mouth-wash before leaving for dinner at midday and before leaving in the evening. If the gums are swollen it is to be used more frequently.

“ All hands are to report at once if the gums are sore or if the saliva is excessive or if they suffer from tremblings of the muscles or neuralgic pains.

“ These rules were carefully observed, and since they have been adopted there have been no fresh cases of mercurial poisoning and no relapse amongst those who had to go on sick leave. A small wooden shed was erected in April in the vacant ground belonging to the Building Department. This shed is used to store the extra Perchloride and also as a Laboratory, where the analyses of the solutions are conducted.

“ In April a letter was received from the Drainage Engineer stating that the fumes of the acids had compelled the occupants of the office, next door to the room where the disinfectants were prepared, to move to other quarters and asking if the disinfectants could not be prepared elsewhere. In the meanwhile, until a new shed in a suitable site could be erected, I had matting screens put up which, to a large extent, have lessened the nuisance complained of and the office staff have returned to their old quarters.

“ With the exception of this complaint from the Drainage staff, and the cases of mercurial poisoning in our staff, the working of the Disinfectant Depot has proceeded satisfactorily throughout the current year.”

I have the honor to be,

Sir,

Your most obedient servant,

C. H. CAYLEY,

Divisional Health Officer.

Statement showing the number of jars issued to District Officers, month by month, from 1st June 1899 to 31st May 1900.

	June 1899.	July.	August.	September.	October.	November.	December.	January 1900.	February.	March.	April.	May.	Total.
District Officer, A. Ward ...	20	...	25	15	8	23	40	80	75	60	100	35	481
Do. do. B. Ward, North..	...	22	24	10	39	25	36	70	60	60	36	36	418
Do. do. B. Ward, South..	...	10	16	15	20	10	40	20	40	30	40	30	271
Do. do. C. Ward ...	35	40	40	50	37	53	90	120	120	120	45	30	780
Do. Central District ...	24	30	30	23	35	15	60	60	45	75	60	60	517
Byculla Health Camp ...	...	...	...	...	...	...	...	24	12	43	25	8	112
District Officer, D. Ward ...	15	...	...	...	4	2	8	22	35	70	25	...	181
Do. do. E. Ward, East...	60	30	45	24	40	46	50	40	70	90	30	30	555
Do. do. E. Ward, West..	20	64	49	50	70	75	135	240	190	340	300	120	1,553
Do. do. E. Ward, Ripon Road ...	15	25	49	24	42	36	48	75	100	87	66	66	633
Do. F. & G. Ward ...	...	15	15	19	62	78	126	208	234	216	170	112	1,255
Divisional Health Officer, E Ward † ...	2	...	...	...	...	...	...	2	...	...	...	...	4
The Superintendent, Private Health Camp ...	...	...	...	...	...	...	...	1	...	1	1	...	3
Total jars ...	191	236	293	230	357	363	633	962	981	1,192	798	527	6,763

† For an outbreak of Small-pox.

Statement showing the number of jars solution prepared month by month from the 1st June 1899 to 31st May 1900:—

Months.	Jars solution.
June 1899 ...	207
July „ ...	236
August „ ...	240
September „ ...	283
October „ ...	285
November „ ...	382
December „ ...	648
January 1900 ...	1,016
February „ ...	923
March „ ...	1,144
April „ ...	916
May „ ...	482
Total Jars ...	6,762

Statement showing the quantity of Hydrochloric Acid used month by month from the 1st June 1899 to 31st May 1900.

Months.	Gallons.	Pints.
June 1899 ...	104	4
July „ ...	118	...
August „ ...	121	...
September „ ...	141	4
October „ ...	142	4
November „ ...	191	...
December „ ...	324	...
January 1900 ...	508	...
February „ ...	461	4
March „ ...	572	...
April „ ...	458	...
May „ ...	241	...
Total Gallons ...	3,383	...

7 jars of Hydrochloric Acid were returned to Messrs. Thomson and Taylor on 7th August 1899 not being of proper strength. These jars were replaced by 7 jars of good quality.

Statement showing the quantity of Perchloride of Mercury used month by month from the 1st June 1899 to 31st May 1900.

Months.	Quantity.					Deteriorated.			Returned to Inspector of Stores, Paltan R.J.				Returned to Messrs. Thomson & Taylor.				Total.				
	Tons.	cwt.	qr.	lbs.	oz.	Tons.	lbs.	oz.	Cwts.	qr.	lbs.	oz.	Cwts.	qr.	lbs.	oz.	Tons.	cwt.	qr.	lbs.	oz.
1899.																					
June ..	0	4	3	5	4	..	..	..	..	..	..	..	..	..	..	..	0	4	3	5	4
July ..	0	5	1	24	7	..	..	..	..	..	..	..	..	..	..	..	0	5	1	23	7
August ..	0	5	1	26	34	0	4	9	..	..	..	..	..	..	..	..	0	5	2	2	12½
September ..	0	6	1	22	7	..	..	..	..	..	..	..	..	..	..	..	0	6	1	22	7
October ..	0	6	1	21	8	..	..	..	..	..	..	..	..	..	..	..	0	6	1	21	8
November ..	0	8	2	14	15	0	0	8	..	..	..	..	* 2	0	3	0	0	10	2	18	7
December ..	0	14	2	16	4	0	2	12	† 1	0	7	0	..	..	..	..	0	15	2	26	¾
1900.																					
January ..	1	2	3	23	12	..	..	..	..	..	..	..	..	..	..	..	1	2	3	23	12
February ..	1	0	3	12	5½	0	3	12	..	..	..	..	..	..	..	..	1	0	3	16	1½
March ..	1	5	3	11	12	..	..	..	..	..	..	..	..	..	..	..	1	5	3	11	12
April ..	1	0	2	22	0	0	1	14½	..	..	..	..	..	..	..	..	1	0	2	24	8½
May ..	0	10	3	16	1	..	..	..	..	..	..	..	..	..	..	..	0	10	3	16	1
Total ..	7	13	0	20	5½	0	13	8½	1	0	7	0	2	0	3	0	7	16	1	15	14½

* In the month of November 2 cwts. and 3 lbs. "Pomer & Sons" Perchloride of Mercury were replaced to Messrs. Thomson & Taylor, vide Chief Accountant's letter No. 6484, dated 18th November 1899.

† In the month of December 35 lbs. Perchloride of Mercury "Dakin Brothers" supplied by Thomson & Taylor and 84 lbs. supplied by Easopfall & Company in October 1899 were replaced to the Inspector of Stores. Vide letter No. 6484, dated 18th November 1899, from Chief Accountant. The latter was found to be adulterated and the former contained a large quantity of Oxide of Mercury which would not dissolve.

The orders in force for disinfection were printed in full in last year's report. Kemp's disinfecting fluid was sometimes used in the place of Phenyle, and the use of Carbolic Acid was discontinued. It was found to mix badly with water, and oil globules of free acid would float about on the surface. On one occasion some children slipped and fell in a place recently flushed with Carbolic Acid, and in consequence of this defect got considerably burned. After this Carbolic Acid was no longer used.

Sterilizers.

Four *Sterilizers* were in use during the year. The "Bowman" at Narielwadi, the "Equifex" at Modikhana have both been in use for some years.

The "Equifex" put up last year at the Byculla Camp was transferred to the Arthur Road Hospital, and another "Equifex" was erected at the Northbrook Gardens. With the exception of out-lying portions of F. and G. Wards, every part of Bombay was thus within reach of one Sterilizer or another, and there can be little doubt that this method of disinfection is considerably superior to that of soaking clothing in buckets of Phenyle solution.

Procedure.

The procedure laid down was followed as closely as possible, and continuous endeavours were made to tighten up the efficiency of the disinfection work. With the Agency employed the necessity of constant supervision is obvious, and instances of slovenly work were frequently brought to light; but on the whole the disinfection was probably more thorough during the year under report than ever before. One abuse that crept in is a curious example of coolie ingenuity. It was reported that some of the gangs were using their disinfection solution for purposes of silver-plating articles of metal. This was promptly attended to.

Captain Lock's remarks on the subject of disinfection are very much to the point, he writes :—

"Every effort has been made to carry out this work thoroughly.
"(a) On two successive days the infected rooms have been completely turned out and the whole procedure laid down for disinfection carried out.

“(b) All clothes in actual use, all carpets, mats, curtains, screens and bedding have been sent to the Steam Disinfector, Modikhana, and from there transferred to the Camp to which it is intended to send the contacts or evicts.

“(c). Discretion had to be used in dealing with other property, such as silks, boots, boxes and other valuables. It is with the handling of such articles that one feels so helpless. The directions are complete, and direct that leather is to be washed with this, and silks treated in such a manner, but it is quite another thing to have the turning out of the heterogeneous collection of a Parsee House, with stores of bygone years, holiday clothes, boxes, large supplies of grain, and all to the tune of a pack of grumbling, talking women. The ordinary clothing curtains and mats and bedding are easily dealt with, as are the approaches and latrines, but I have never left a house after disinfection but with a feeling that if disinfection is of value more might have been done.

“With the poor and lower classes no such difficulties present themselves. Doors have been found locked and owners not present ; but a pasted notice that if the owner does not present himself within 24 hours, the doors will be opened in the presence of the Police, has almost invariably proved successful.”

It is very difficult to give disinfection a fair chance. The people now for the most part accept it as an inevitable inconvenience, but the number who realise the importance and value of it is still extraordinarily small, and the result, in a large number of cases is that, as soon as they realise that the Plague Staff will come to disinfect, some, and often all the kit is quietly removed to a neighbour's room. This, of course, involves risk of the spread of infection, and when the original room is re-occupied the old kit is brought back, and another case possibly occurs. Such instances are used as an argument for the futility of disinfection, whereas the real fact is that thorough disinfection has been defeated by the people themselves. Among Parsees and Mussulmans, again, disinfection is deprived of a fair chance by the religious scruples of these communities : for three days after a death the work cannot be done on account of religious ceremonies ; and in the meantime much mischief may occur.

It is exceedingly difficult to know what to do in cases where infection is suspected in a godown containing valuable property. If the property was certainly infected and likely to spread the disease, it would, of course, be thoroughly disinfected or destroyed without hesitation, but where the probability only amounted to a possibility and any satisfactory method of disinfection involved the loss of hundreds of rupees, the problem was usually solved by spreading the articles out in the sun.

In C. Ward and the Central District, and to a certain extent in other parts of the City, whenever time permitted, attention was devoted to the disinfection of empty houses with bad records. That this measure was of some value, is indicated by the fact that in cleaning up and disinfecting 83 such houses in C. Ward, 281 dead rats were found. The total number of dead rats found by the disinfecting gangs in the course of their work in C. Ward during the year was 669.

Tile turning was continued during the year with a view to thoroughly ventilating infected quarters, but was confined to single storeyed buildings, and only resorted to in the case of buildings of several storeys when upper storeys were affected.

One example, where it was possible to carry out disinfection thoroughly, in accordance with standing orders with most satisfactory results, is worth quoting. The circumstances are stated in the following report from Dr. C. H. Cayley:—

“I have the honour to forward a report giving details of the outbreak of “Plague in the Municipal chawls at Valpakadi, and the effects of the measures of “disinfection adopted for controlling the same. From May 1st up to May 14th “there were 14 deaths from Plague in the Municipal chawls themselves. On “May 12th the chawls were thoroughly flushed inside and out with the engine and “every room and all clothes and furniture were thoroughly disinfected under the “supervision of Capt. Bolton, the District Officer. This disinfection was not “completed until the afternoon of the 14th. On the 15th and 16th there were “two deaths in the chawls of people who had been ill since the 12th and 13th, “respectively, with Plague, *i.e.*, had been attacked before the disinfection was “completed. These people were not removed from the chawls, but were allowed “to remain in their rooms which were afterwards disinfected. From May 10th “to May 13th there were 6 deaths from Plague. After that date, with the exception “of the two cases referred to above, there have been no deaths or attacks from Plague “in the chawls themselves, although there have been several cases of Plague in the “huts outside the chawls. The thorough disinfection of the chawls that was adopted “put a complete stop to the epidemic in the chawls, and there was no recurrence, “although numerous cases of Plague were occurring in the immediate vicinity of “the chawls.”

I have, &c.,
(Sd.) C. H. CAYLEY,
Divisional Health Officer,
No. 1 Division.

**Improvement
and demolition
of Insanitary
Buildings.**

The important but most difficult work of house improvement remained in the hands of the Executive Engineer, under the direct control of the Municipal Commissioner. The following summary of the year's work has been supplied by the Executive Engineer:—

During the year, ending 31st May 1900, a systematic inspection of houses in the following districts, which was in hand at the commencement of the year, was continued:—

Colaba, Fort, Dhobitalao, Chakla, Mandvi, Umakhady, Dongri, Bhuleshwar, 2nd Nagpada, Byculla, Market, Khara-talao, Kumbharwada, Tardeo, Khetwadi, and Mazagon. The Walkeshwar District was also taken up during the year. The inspection of houses in Kamatipura and Dhobitalao Districts was completed during the year, and the improvement of several houses in these and other districts carried out, while that of others is in progress. Stray cases in the remaining districts of the City were also inspected when their improvement was urgently demanded.

1,867 buildings were inspected during the year under review, of which 1687 were found more or less in need of improvement, 170 incapable of improvement and fit for demolition, the remaining being such as not to require any improvement. In all 245 houses and sheds were actually demolished during the year.

Notices.

During the year 2,787 notices were issued requiring the house-owners to improve their buildings, out of which the owners

of 1,056 houses took the work of improvement in hand. 533 houses had to be declared unfit for human habitation, out of which 34 houses were closed permanently for demolition, 255 temporarily for enforcing improvements in them, and 244 to allow of action being taken for the immediate improvement of their ventilation.

The work of abating over-crowding in the congested parts of the City was carried out during last year. In all 128 notices were served to reduce over-crowding and in 126 houses over-crowding was abated.

During the year 110 certificates of fitness of houses for human habitation were issued on the houses being rendered fit for that purpose.

During the year a sum of Rs. 2,273 was awarded as compensation by the Government Assessor for buildings condemned for demolition under Sections I and IX of the Notification No. 228P—10-2-97 and by the Municipal Commissioner for those demolished under Section 426 of the Municipal Act. The total sum actually paid during the year as compensation on account of these awards, was Rs. 6,920.

Under Government Notification, No. 2675P—3027 of 10-5-1898 Municipal men were employed to carry out the work of improvement of the ventilation of 73 houses. Soon after the men were employed in almost all cases the owners themselves took the work in hand, and at their request the Municipal men were withdrawn. In 58 cases the charges have been recovered.

Destruction of rats.

The following Statement shows the number of rats destroyed in Bombay during the year ending 31st May 1900, as compared with the year ending 31st May 1899 :—

Ward	June.		July.		August.		September.		October.		November.		December.	
	1898	1899.	1898	1899.	1898.	1899.	1898.	1899.	1898.	1899.	1898.	1899.	1898.	1899.
A. ...	...	3,192	48	2,527	59	2,746	44	4,890	1,348	3,459	3,715	4,807	5,095	8,336
B. ...	...	11,18	33	13,284	1,101	14,189	3,888	15,476	7,241	13,623	5,115	12,333	11,313	11,697
C. ...	864	947	359	1,938	630	2,389	1,429	4,027	2,783	6,726	2,854	7,676	4,338	11,374
D. ...	...	29	102	360	191	111	234	72	248	47	285	265	270	1,841
E. ...	...	407	752	...	5,141	...	5,636	...	5,391	...	5,124	...	6,495	...
F. ...	...	134	29	...	22	...	66	...	125	...	28	...	33	...
G. ...	...	44	51	56	220	...	309	...	205	...	132	...	83	...
	864	16,208	1374	18,165	7,368	19,935	11,106	24,465	17,341	23,855	17,753	25,131	27,617	33,243

Ward	January.		February.		March.		April.		May.		Total.	Total
	1899.	1900.	1899.	1900.	1899.	1900.	1899.	1900.	1899.	1900.	1898-99.	1899-1900.
A. ...	5,478	9,300	4,864	9,912	3,606	11,520	5,356	8,811	5,622	10,599	35,335	80,099
B. ...	17,288	12,960	2,605	15,133	9,856	12,669	11,894	14,122	11,470	11,696	81,804	158,418
C. ...	6,592	8,083	4,489	5,088	2,201	3,849	1,064	2,874	760	2,340	38,353	57,811
D. ...	230	2,333	314	20	498	...	485	...	478	...	3,855	5,347
E. ...	6,202	...	1,794	...	584	...	169	...	416	...	38,108	407
F. ...	29	...	39	...	36	...	36	...	32	...	475	134
G. ...	66	...	64	...	64	...	53	...	31	...	1,278	100
	35,805	32,676	14,169	30,153	16,845	28,038	19,457	25,807	18,809	24,635	188,608	3,01,632

There were 4 men employed at various times during the year for the sole purpose of catching rats and they destroyed 1,685 rats of the above total.

CHAPTER IV.

Inoculation.

Little success was attained in the matter of inoculation during the year 1898-99: and during June, July, and August, the first three months of the year under report, very few operations were performed. It was felt, however, that every possible endeavour ought to be made to push this measure of protection against plague, and the following circular was accordingly issued on 24th August 1899:—

**Inoculation
Circular.**

The Commissioner wishes District Officers to encourage inoculation by every means in their power. They should, so far as possible, get the volunteers on their side and get them to use their influence in the matter.

They should also, as is done in parts of E. Ward, make a practice of offering inoculation to contacts and evicts as an alternative to being sent to camp; but it must be very clearly understood that no person who is not inoculated will be exempted from eviction, &c., on the ground that most of his family have been inoculated, and that infected rooms must be disinfected whether the residents have been inoculated or not.

It must also be clearly understood that no one who develops Plague will be exempted from removal to hospital solely on the ground that he has been inoculated.

Here and there landlords, who have taken an interest in the matter, have got their tenants inoculated. Further influence might be brought to bear in this direction, and it might be pointed out to landlords that if *all* their tenants are inoculated, their chawls will not be liable to vacation.

The Commissioner desires that District Officers will get their whole staff inoculated if possible; if they will themselves set the example, so much the better.

In future, new hands should not be taken on unless they have been inoculated.

The Commissioner sanctions, with effect from August 26, a fee of Re. 1 per ten persons inoculated by each Sectional Medical Officer, exclusive of any drawing a special inoculation allowance, subject to the following conditions:—

The inoculation must be performed in the presence of the District Officer or someone else specially named for this purpose by the Commissioner, who must, to every bill, attach a certificate to the effect that the operations have been performed in his presence, and that none of the persons, so far as he can ascertain, have been inoculated more than once before.

A careful register must be maintained in the attached form giving particulars of each person inoculated.

A weekly statement of the number of persons inoculated and re-inoculated by each Medical Officer must be forwarded with the weekly report.

A certificate of inoculation in the usual form must be given to each person after he has been inoculated with the *full* dose. No certificate is to be given until then.

Compensation up to a maximum of As. 4 may be paid on the spot to any person whose position is such that the absence from work on account of the reactionary fever is likely to cause him hardship.

Half an anna may be paid to any man who succeeds in bringing another man to be inoculated.

Copies of Dr. Bhalchandra's pamphlet upon inoculation are forwarded herewith for the use of the District Officers and distribution to volunteers and others interested.

The District Officers threw themselves heartily into the work, and the extracts given below show the vigour with which they tackled it. Captain Pritchard, District Officer, Central District, writes :—

**Central
District.**

As regards the efforts made to induce the people to inoculate themselves, it is a fact worthy of notice that, owing to the criticisms of Colonel Lawrie, I.M.S., and others before the Indian Plague Commission, the people of Bombay had resolutely turned their backs on the subject of inoculation and would have nothing to do with it. In the month of June 1899 inoculation was, one might say, unheard of in Bombay; for the time being it was, to all purposes, dead—and none would discuss it.

About the middle of August the District Officers were instructed to make special efforts to popularize inoculation. At first sight the task seemed difficult, and shortly afterwards impossible of achievement. The people would not listen: they would look at you as if you were demented, or smiled pityingly and walked away at the mere mention of inoculation. It was plain, however, that interest had to be aroused, and, by the end of the month of July, the *Times of India* and some few other newspapers began to treat with the subject. Propositions were put forward by various people and printed in the newspapers as to the best way to get the people to inoculate themselves. It was also shown that, though plague in epidemic form had died out in the city, yet it was raging in Poona and other places around. The cumulative force of evidence gathered from places and people who had been inoculated was also discussed and brought to bear in support of inoculation. Government officials were urged to set an example and get themselves inoculated before the masses in central localities. Others suggested that inoculation by lottery was the only way to get the poorer classes to take to it. Some said that it would be useless to try to push inoculation amongst the ignorant poor, and therefore urged that it be made compulsory.

Meanwhile time was usefully employed in drawing the attention of the people to the benefits of inoculation through the arguments put forward in the newspapers which dealt with the subject. I think up to the beginning of August only the English newspapers gave space to the subject, more particularly the *Times of India*. At this time, viz., in July 1899, it printed a deal of useful matter concerning inoculation at Belgaum and other places. On August the 10th, His Excellency Lord Sandhurst opened the Plague Laboratory at Parel in the presence of the principal residents of Bombay, English as well as Native. This added interest to the subject and was evidence in itself that Government were satisfied on all points concerning the value of Mr. Haffkine's prophylactic for anti-plague inoculation. The speeches of His Excellency and Major Bannerman were widely discussed. But, as we had to retail the substance of these speeches to the people in our districts, we experienced many difficulties, as unexpected as they were surprising. For

instance, Major Bannerman had spoken of the plague bacilli excreting poisons into the broth on which they fed. Those who were against inoculation at once took up the words, and explained them to the natives in their vernaculars so as to still further poison their minds against inoculation by insinuating that these excretions would destroy their caste, and inoculation, therefore, be subversive of their religious principles. In fact, the utmost caution had to be used in dealing with these stories, for there was in them a mixture of the truth and the lie, a compound that sinks deepest into the hearts of most people and is the most difficult to eradicate therefore, more especially amongst the ignorant and less intelligent classes. Again, on the 28th August 1899, His Excellency Lord Sandhurst presided at another meeting at the Imperial Laboratory, and here Major Bannerman explained the process of producing the prophylactic before a large and very representative audience, gathered together by the District Officers, from the communities and classes of the people of Bombay. There were men there reputed millionaires, and there were men there who lived on eight annas a day, from a Judge of the High Court to a headman of grass-cutters. The entire company were then taken over the Laboratory for a tour of inspection, and they were induced by every means to become interested in all they saw and heard. This demonstration, indeed, formed the foundation of our future labours, as they could lay to heart all they saw and heard in explanation of the preparation of the prophylactic and the process of inoculation.

Now that interest had been aroused, it was seen that not a moment was to be lost in communicating it to the masses of the people in the city. It was necessary to put all one's heart, soul, and ability into the work. In fact one had to work day and night; had to be desperately serious about it. It is impossible really to conceive the difficulties that presented themselves at every turn. It is necessary to know the people and the state of society of the people to realize them, for in Bombay we have a greater number and mixture of communities amongst the native population than, perhaps, any other city in India. Moreover, time was all important, and since a good opportunity presented itself it was necessary to take it there and then.

On the 3rd September 1899, therefore, a meeting was held at Muzaffarabad Hall, under the Presidency of Mr. Justice Budrudin Tyabji, at which almost every community was represented. The speakers* were laymen, as well as priests and religious teachers of the people, and well-known native medical practitioners. As a result ten persons were inoculated in presence of the gathering, which was the largest and most influential of all the many meetings that followed afterwards. But the main result was this—that it stirred up the entire native population of Bombay. In fact, for days and weeks afterwards, inoculation was the chief topic of conversation. People took up sides on the question: even the native newspapers joined, adding of course more fuel to the fire than anything else could have done. In fact the opposition were welcomed and thanked for their efforts. This meeting was, nevertheless, considered as being a Mahomedan one, and Captain Cuppage immediately took the cue, and, straining every nerve and sinew, promptly gathered together all the Hindus at a meeting, which fairly set "the ball going;" with what measure of success may be judged from the fact that, in about six months afterwards, there had been over a hundred thousand people inoculated in Bombay.

Following on the heels of these meetings innumerable smaller ones were held in all parts of the city. Volunteers came forward and gave the greatest assistance possible, and nobly aided the District Officers in their efforts. The latter were,

* Nawab Mohsin-ul-Mulk Bahadur was the most important speaker.

moreover, made to meet at the Municipal Offices by the Municipal Commissioner, who presided ; and, with detailed knowledge of the state of affairs possessed by the Deputy Commissioner, the District Officers were guided and instructed as to further steps to be taken in carrying out the inoculation of the people, every encouragement being given to set forth our views on the subject, which were thereafter fully discussed and considered. These meetings produced more efficient combined action and tended to keep all officers and others interested in touch with the progress of affairs, which was so necessary considering the division of the city into various areas controlled by the several District Officers. By these means alone it was possible for all to know how each district was progressing. Moreover it produced a healthy tone of emulation and so stimulated to further effort. In October, when it appeared that inoculation would be taken on by the people, the staffs of the District Officers were increased proportionately with the work being done. In order also to make matters sure, the Sectional Medical Officers had all to attend at the Laboratory at a lecture given by Major Bannerman, in amplification of his previous lectures, explaining fully the technique of the process of inoculation. Later, in order to obviate all doubt in the matter, those who were not fully qualified Medical Officers had to pass an examination in the process of inoculation. Meanwhile various pamphlets were in process of preparation with a view to giving them gratis to the people, for instance, in the first week of October, the *Indu Prakash* Press issued and distributed seven thousand copies gratuitously, followed the next week by the *Bombay Samachar* Press, which issued 10,000 Gujarati copies. It was strange to notice the knowledge and interest shown unconsciously by certain of the public in the progress of affairs at this stage, for letters appeared in the newspapers, by various unofficial correspondents, criticizing not only the propaganda, but the methods pursued in carrying out the inoculation of the people.

To meet the wishes of the people inoculators had to be sent to various places to carry out inoculation ; but the main plan was to have inoculation stations in central localities all over the city. Many European and native gentlemen successfully set examples by getting themselves inoculated and persuading their superior and subordinate staffs. In the Central District we had numerous instances of such a kind, more especially amongst the poorer classes of Hindus. To cap all, it was announced in all the newspapers that the Viceroy and all accompanying him on his tour had been inoculated, previous to starting, viz., on 21st October 1899. Meanwhile the various newspapers were replete with letters of all kinds on the subject of inoculation for and against ; amongst the latter the *Kesari* was notorious, and quite a number of correspondents from all parts entered the lists. About this time the Aga Khan's instructions for the inoculation of his community had arrived and were given effect to practically.

By the beginning of November, various reliable statistics, demonstrating the splendid results achieved by inoculation, were coming in from all parts, and these were explained to the people, and thus tended to urge forward with greater conviction the cause of inoculation.

About this time a death occurred from tetanus after inoculation, which, however, was declared to have been caused through no fault of the operator. Again, the poor, who were now coming forward in large numbers owing to their being chiefly of the subsistence-earning class, complained that the four annas given by Government was insufficient, as they were laid up with a bad arm for several days. The former case passed almost unnoticed, but the latter was duly considered and threshed out, ending finally in the decision not to raise the sum, but that in particular cases help might be

afforded. The matter was seen to be one in which charitable people might well be induced to assist ; accordingly they were asked and gave most liberally in money, food, and clothing.

It is necessary to place on record the fact that, whilst inoculation was being pushed as I have described, there was at bottom, amongst the people, a real fear to undergo the operation as the detractors of inoculation had set afloat the most absurd lies as to the evil effects of it. These men did not hesitate also to work upon the religious feelings of the people, and in many instances persons actually were not only threatened but outcasted for having got themselves inoculated. There was a time, moreover, when ugly rumours were maliciously set going that inoculation was to be made compulsory, and some of our staff complained of being threatened by unknown persons. To obviate this, some 200 placards were kept ready, printed in vernacular, stating that no compulsion, but voluntary, inoculation was the policy of Government. I am glad, however, to say that the placards have never been found necessary to use, the year having passed without any kind of trouble. Much useful work was done also by private practitioners ; and in the Central District the Mahomedan Hakims, who had the most influence amongst the people, and who from the first opposed inoculation, were taken in hand and lectured to by Dr. Mayr of the Parel Laboratory. The latter with the greatest patience and perseverance took great pains to make them understand ; but results have proved that money with them comes first and conscience takes a back seat. They have done nothing despite their promises of assistance. Similarly nothing resulted from the meetings held amongst the Cutchi Memons and Hallai Memons, though K. B. Abdur Rahman and K. S. Shumar Patel arranged them. In all the meetings and lectures held as described above, I found K. S. Dr. Fazl Ahmed an invaluable assistant. With a good knowledge of English and also of the subject, he was always the chief speaker at these meetings ; he was in fact my right-hand man in all this work, and much of the success that attended the cause of inoculation was due to his unflagging zeal, constant perseverance, and the tact and ability he showed in the work. Working abroad day and night, he yet found time to write an excellent pamphlet on the subject of inoculation in Urdu, which was published and distributed to the public. The Mahomedan community declared Dr. Fazl Ahmed an infidel for the writing of the pamphlet, and the Native papers criticized it in every way.

I append a list of contributions made by charitable persons to encourage the people to get themselves inoculated. The first and foremost among them comes Sirdar Kassim Mithla, who set an example which was afterwards followed by others all over Bombay. It is in a great measure due to his work in this respect that the Central District heads the list of all the Districts in the total number inoculated (about 25,000). As regards special assistance I wish to record that rendered by Kasam Bhai Moosa, who induced the Khojas of Umarchadi to be inoculated. In a similar way valuable assistance was given by Messrs. Mehramji and Valubji, and in both the abovementioned cases Dr. Miss Corthorn officiated at the inoculation of the females of these communities. More would have been done by these gentlemen but caste prejudices stifled their efforts. Also Messrs. Sita Ram and Devji, of the Central Hindu Committee, arranged meetings and set the example by being themselves first inoculated, but, this community being wedged in amongst the mass of the Mahomedan community, they shared the same feelings of sullen opposition to the cause of inoculation.

In 2nd Nagpada, K. B. Hakim Dyem and his assistants, Messrs. Abdur Rahman and Mahomed Hussein, rendered most conspicuous service in support of inoculation. In Khara Talao, Messrs. Hassan Ali Hakimji, Abdul Ali Kurimbhoy, Abdul Hoosain, and others of his community. In Byculla our only worker was K. B. Abdur Razzak, who worked very hard.

Names of gentlemen who have contributed in aid of inoculation and the details of their contributions :—

1. Sardar Khan Bahadur Kassim Mitha— 200 Rupees. 27 Bags of rice. 5 Bags of date. 25 White blankets. 107 White sheets. 10 Bundles of Indian Cloth.	6. Khan Saheb Hasanali Mulla Hakimji— 10 Bags of rice. 2 Bundles of Native clothes. 1 Box of soap.
2. Rao Saheb Vasanji Trikamji— 50 Bags of rice.	7. Mr. Abdul Ali Karim Bhai— 50 Rupees. 10 Bags of rice. 1 Bag of pulse. 60 Blankets.
3. Mr. Haji Ismail Haji Harun Zakria— 50 Rupees. 9 Dozen coloured handkerchiefs. 5 Bundles of flannel.	8. Haji Ismail Jan Mohamed— 8 Bags of rice.
4. Sardar Umar Jamal— 8 Bags of rice.	9. Mr. Suleman Abdul Wahed— 4½ Bags of rice.
5. Mr. Lakhamji Nappoo— 10 Bags of rice.	10. Rao Bahadur Karamsi Damji— 4 Bags of rice.
	11. Mr. Kasam Bhai Moosa— 2 Bags of rice.
	12. Messrs. Mohamed Hasan and Abdul Rahman— 10 Bags of rice.

Captain Bolton, Assistant District Officer in the Central District, writes as follows regarding 2nd Nagpada :—

On the 27th August Khan Bahadur Hakim Mahomed Dyem, the Chairman of the Volunteers, called a meeting at the Dyem Mansions in Tank Street. All the members were present and the meeting was largely attended. Captain Pritchard, the District Officer of the District, with Lieut. Menzies, the Assistant District Officer Lieut. Haworth, and the Sectional Medical Officers were all present. The meeting was addressed both by the District Officers and members, and the result was that about 40 persons were inoculated that morning. Dr. Moonje, who was S. M. O. of the section, had the honour of performing the first inoculations.

For the months of September, October and November, none but contacts were inoculated, and this was chiefly confined to the low caste Hindu community, who at that time suffered most severely from the epidemic. Khan Bahadur Hakim Mahomed Dyem accompanied the Medical Officer daily on his rounds, and the success of inoculation is greatly due to the persuasive measures adopted by him, assisted as he was by Mr. Abdool Rahman and Mr. Mahomed Hoosain. In a short time the beneficial results of inoculation were noticed by the Hindu community, and by December it was difficult for the S. M. O. to cope with all who came forward for voluntary inoculation. From that period the good results of inoculation were established.

Example.—At 177, Grant Road, where about 200 mochiees live under one roof, a plague case occurred ; the contacts, 8 in number, were asked to submit themselves to inoculation or be removed to camp. Seven were inoculated, the eighth was stubborn and consented to go into camp, but asked for a day's grace which was granted. Before the expiry of the 24 hours the unfortunate man was attacked and removed to the

A. R. Hospital, where he succumbed the next day. When in the ambulance, it was most pitiful to see how the man begged to be inoculated and he firmly believed it was the only means of saving his life. This was enough for the mochies : from that day they were advocates for inoculation. The Mhars and other low caste Hindus followed in their steps. With great difficulty a few Mahomedans were inoculated. Previous to December it was difficult to get a woman or child to be inoculated. Since then it has been the reverse, and if a comparative list be taken the women and children will be found to predominate since that month.

In Kharatalao and Bhuleshwar successful meetings were held at the residences of Khan Sahib Hassan Ali Mulla Hakimji, Mr. Abdul Ali Karimbhoy, Mr. Nurbhai Budhabhai, and Mr. Govindji Ramji, and an unsuccessful meeting at the house of Mr. Badrudin Abdulla Kur. At these meetings the District Officer and his assistant, with the Sectional Medical Officer, Doctor Munshi, endeavoured to convince the audiences of the value of the prophylactic, and various private individuals assisted both by precept and example.

In concluding this account of the work done in the Central District, a copy of the Resolutions passed at a meeting of the Anjuman-i-Islam is attached :—

RESOLUTION No. 1.

Proposed by Dr. Ismail Jan Mahomed, seconded by Khan Bahadur Hakim Mahomed Dyem, and supported by Khan Saheb Dr. Fazal Ahmed—

That in the opinion of this meeting the beneficial results of inoculation have been proved by science and confirmed by experience, and that it is the duty of all people possessing influence to exercise their influence for the purpose of encouraging inoculation amongst the masses of the inhabitants of Bombay.

RESOLUTION No. II.

Proposed by Mr. Ibrahim Rahimtula, seconded by Mr. Maulvi Abdulla Ahmed, and supported by Mr. Maulvi Hidayatula—

That with a view to encourage inoculation it is recommended that a special request be made by the Anjuman-i-Islam of Bombay to the religious heads of the various Mussalman Communities, to the Mutawallis of the various mosques, to the teachers of the various schools, to the Mussalman landlords, and to the employers of labour, to induce their followers, devotees, pupils, tenants, and workmen and servants, to resort to inoculation as the best means of escaping from plague.

RESOLUTION No. III.

Proposed by Khan Bahadur Mahomed Hussein Hakim, and seconded by Mr. Haji Yusuf Haji Ismail—

That in the opinion of this meeting it is desirable that every person effectively inoculated should be furnished with a certificate, on the back of which should be endorsed the exemptions and privileges to which he is entitled under the Resolution of Government, such as freedom from detention, segregation, and quarantine, &c., &c.

(Sd.) B. TYABJI.

C. Ward. The following extract is from the report of Captain Cuppage, District Officer, C. Ward :—

It was not until some time had elapsed after receipt of the instructions to encourage inoculation that the actual work of inoculation was commenced in C. Ward. Knowing that a greater portion of the population of this district comprised wealthy high-caste Hindus and Jains, I deemed it inadvisable to plunge *in medias res* without first preparing the ground. It is, perhaps, needless for me to say that this preliminary preparation necessitated the greatest caution, required a considerable amount of tact, and above all things patience. Before taking any other steps, I got as many as possible of the leading men of the various communities in the district into my confidence. I endeavoured, as far as possible, to persuade those who were opposed to inoculation of its benefits, and so enlist their influence with their co-religionists on my side. Considerable time was taken up in personal visits to native gentlemen and in holding meetings in various parts of the ward at all times of the day, and often at night, when the advantages of inoculation were carefully explained, and the concessions the Government was willing to confer on the inoculated clearly pointed out. The work was often most discouraging. The apparent good results obtained at some meeting might in a week or so be frustrated by an anti-inoculation article in some vernacular paper, and the whole of the ground would have to be gone over again. I cannot speak in too high terms of these native gentlemen who responded so readily to my appeal for assistance. Some of them incurred the displeasure, as well as the distrust, of their co-religionists, who, ignorant of the ingredients used in the preparation of the serum, bitterly opposed inoculation on religious grounds. Notwithstanding all the difficulties that beset the work, numerous efforts were made to popularize inoculation. Two of the greatest difficulties we had to face in C. Ward were :—(i) the opposition from native practitioners, hakims and vairs, of whom there are a very large number in C. Ward ; (ii) the unreasonable opposition of the people themselves. The objections raised to inoculation on the ground of religion were most difficult to overcome, and were brought forward largely by the Jains, a very influential and orthodox community, the Bhattias, who are of much the same standing, and wealthy Brahmins. It was almost impossible to make the Jains believe that no animal-matter was used in the preparation of the serum. It was clearly demonstrated to some of their leading men at the Government House Laboratory, Parel, that the serum contained nothing forbidden by their religion. But it was all of no avail as far as the Jains were concerned. Even after the Government had sanctioned the preparation of a special serum made from flour for the Jain caste, they would not avail themselves of inoculation. A few Jains have been inoculated. When I thought I had made some progress towards convincing the leading men of the communities of the advantage of inoculation, I heard privately that a large and influential meeting, presided over by some of the most orthodox and wealthy men, was to be held at Pydhonie, at which resolutions were to be passed strongly condemning the measure. On this as on many other occasions, Dr. Poput Parburam Vaid, Volunteer and Chairman of No. IV Committee, Fanuswady, rendered myself, and the cause of inoculation generally, the most valuable assistance. He at once informed me of the proposed meeting, and, with my approval, took the organisers to the Parel Laboratory, where he demonstrated to them the preparation of the serum, and allayed their fears, with the result that a meeting which might have proved dangerous to the cause was never held at all.

The vairs and hakims alluded to above are very numerous in C. Ward and some of them command a large practice. I thought it would be a wise step to endeavour to get them on our side as much as possible, or at any rate to take a neutral part. Many of them had strange ideas regarding inoculation, which if

preached amongst the people, would have found a ready hearing, as I am told many of these men have a great influence over the lower classes. In this instance Dr. Poput Parburam Vaid again most willingly offered his services. His father, who is one of the leading and most enlightened vairs in Bombay, established a medical school for vairs in Girgaum, which is now presided over by his son, who lectures to the students on Native and English medicines. This school is largely attended by students from B. and C. Wards, so that Dr. Poput knows something of most of the vairs in Bombay. Frequent meetings were held at this school in the presence of myself and Lieutenant Brackenbury, at which Dr. Poput Parburam and his father spoke at length on the advantages of inoculation. In addition to this we took a great number of these Vairs to the Laboratory at Parel, where the whole process of the preparation, &c., was shown and explained to them. Some of the vairs came forward for inoculation themselves. Others, though not inoculated, were induced to admit that it was not harmful or objectionable on religious grounds, and many who might have preached against it promised to take up a neutral position. These satisfactory results were, I consider, in no small measure due to Dr. Poput's personal influence over these vairs, as well as to his untiring efforts and devotion to a cause in which he has the most implicit faith.

A very large and influential meeting was organised at the Gaiety Theatre, which was very kindly placed at my disposal for the occasion by the Managing Proprietor. I was anxious to secure the services of the most influential leaders of communities in the ward, and, again through Dr. Poput's instrumentality, Seth Veerchand Deepchand, C.I.E., one of the most prominent Jains in Bombay, was induced to preside over the meeting. It was largely attended, and was in every way a grand success. Sir Bhalkhandra Krishna, Dr. Ismail Jan Mahomed, Dr. Poput Parburam Vaid, and others, addressed the meeting. I myself, Dr. Poput Parburam, Rao Saheb Purshotum Odhowji, Dr. Purshotum Harichand, Dr. Rao Saheb Missir, and numerous others, came forward for inoculation. In all 75 persons were inoculated. I hoped that Mr. Veerchand Deepchand's countenancing such a mass meeting would have had a wholesome influence on the rest of his community, but unfortunately my hope was not realised. The Jains have not taken to inoculation.

Lieutenant Browne, Assistant District Officer in C. Ward, was very successful with inoculation in the Kumbharwada Section. He writes as follows :—

The system adopted was this. Having satisfied ourselves that a case of plague had occurred in a house we decided what houses would have to be vacated. In Kumbharwada, where the houses are for the most part very filthy and all the houses more or less connected, it generally meant one storey. The volunteers then came and spoke to the people. As a rule they came round readily enough, but they generally wanted to have one person per room left so as to look after them in case they got fever. This was allowed, and then the people who were coming forward were carefully tested with the thermometer, and if they passed the tests performed upon them we tried the remaining occupants of the house, and generally got some of those. The next day I always came round and had a look at the inoculated persons and gave relief to those whose arms were very bad or who could not go to work owing to fever. We then came round again another day, and tried to get the remainder we had left behind the first time. I admit that this was not satisfactory altogether, but it was better to save a few lives than none at all, as, in my humble opinion, in Kumbharwada evacuation, unless it is carried out by the whole street at a time, is procrastination. Time after time in certain houses the people would be sent to camp, stay 10 or 15 days, and about 4 days after their return some one would develop plague. All this time the inoculated persons were living in the same

infected houses and remained free. Several landlords in Kumbharwada have begun to see at last that inoculation does render the people immune from plague, and they have assisted a good deal in urging their tenants to get inoculated, and have also promised to bring their housepeople for inoculation next year. Some of these men were distinctly against inoculation at first: so it is very pleasing to see them turn round. Next year, with luck and if no malicious people start lying rumours, we ought to get a very large number of inoculations.

After writing the above he added :—

Since the above report was written about 600 inoculations have been done up to 13th June and there have been five more deaths amongst the inoculated. Out of these 5 persons (all of whom died of plague), 3 had been inoculated over 6 months, one $4\frac{1}{2}$ months and one only 9 days. The latter was a contact like the majority of persons whom we inoculate and probably had the disease in him when inoculated.

A. Ward. The hard and successful work done in A Ward is well described in an extract from Captain Lock's report :—

In August 1899 an energetic and systematic campaign was started in this district to popularise inoculation. In addition to the regular staff of the district an extra medical man was engaged to devote his whole time to the work. The greatest interest was shown by one and all. The volunteers responded gladly to the call of the District Officer for help in this direction. In Colaba a great impetus was given to the work by means of local public meetings in Thomas Street, Maneckjee Street, and Victoria Bunder. At these meetings, which were held daily, speeches were made explaining, in the vernacular, the benefits of inoculation, and volunteers and staff came forward and were themselves publicly inoculated as an example. In the Fort the same means were employed. In Bazaar Gate Street at the Fountain, in Frere Road, and in Manordas Street, largely-attended meetings were held and speeches made. From the first the hands of the staff were full, and, although not to the extent that was hoped, numbers became inoculated, and these numbers increased every month, until, by the end of May 1900, 33,131 had been inoculated.

Mr. Mody and Khan Bahadur Patel, on behalf of the Parsee Pancháyet, also held public meetings in Pitha Street, Hornby Road, and Gunbow Street. It cannot be said that these were met with any great success, and, as a body, the Parsee community were dead-set against the movement. In the previous year this community, not to any great extent, however, had been the pioneers, but this year, influenced by opposition correspondence in the newspapers, priest influence, and exaggerated reports of mishaps said to have followed on the operation of inoculation, they as a community were most backward. In my opinion the real reasons were—a fear of the inconveniences of inoculation, an assurance of infallibility to infection, and a carelessness of risk engendered by their belief, in common with all natives, in fatalism.

In addition to these meetings well-written pamphlets in Guzerati and Maráthi were circulated wholesale from house to house in the streets and in all the big working centres and factories. The Arsenal, the printing presses, the business houses, the mills, cotton presses, hotels, Gun Carriage Factory, and Railway Workshops—to all these pamphlets were issued, and to the Head of these departments letters were addressed, and under their supervision meetings held and speeches in the vernaculars made to the employés. These Heads of Departments backed us well and in some establishments inoculation was carried out wholesale. In Messrs. Volkart Bros. Establishment, Messrs. Treacher & Co., Watson's Hotel, Gun Carriage Factory, Colaba Land & Mill Company, and Oriental Mills, large numbers were

inoculated. In no part of the district was success more assured than in the big chawls of Karwar Street and Kochin Street and in some places in Frere Road. In these parts Mr. N. N. Guzdar was the agent; he worked indefatigably and has done so consistently the whole year. His work has been invaluable, and it is to inoculation that I attribute the few cases of plague that have occurred in these chawls this year.

Of those who have given me assistance in inoculation the following are most noticeable :—

- *Mr. N. N. Guzdar.
- Mr. Damodhar Gordhandas, J.P.
- Mr. Mody.
- *Khan Sahib Faridudin.
- *Khan Bahadur Patel.
- *Mr. Mahomed Ebrahim.
- Mr. Crawford.
- Mr. Harischander.
- *Mr. Merwanjee.
- *Mr. K. R. Cama.
- *The Manager, Watson's Hotel.
- Major Stanley Smith.
- *Mr. Volkart.
- *The Manager, Treacher & Co.
- *The Head Master, Elphinstone High School.
- O. C. Colaba Dépôt.
- *P. M. O. Colaba.
- O. C. Arsenal.

I mark with an asterisk the names of those who met with the greatest success.

Contributions—As time went on it was found that 4 annas was not sufficient compensation to the working classes, that the subsequent action of inoculation was to cause at least 3 days' fever and local pain, which quite incapacitated workmen.

From October 1899 appeals were made to charity to add to the Government grant by an issue of rice. This has been met with great success. The first attempt on a large scale was made in this district by Lieut. C. H. B. Adams-Wylie, I.M.S., and his wife, who generously came forward and started a station on the Esplanade for beggars and destitute people. Their scheme was to give one seer of rice to each person inoculated by Lieut. Adams-Wylie. They met with the greatest success and fed and inoculated no less than 100 persons a day. At first they fed the people for 3 days on a daily ration, but, as the numbers increased so rapidly, reduced the ration to a single day. I cannot speak too highly of the conscientious way in which Mrs. Adams-Wylie took her share of the work. The expense incurred by them must have reached Rs. 1,000 in all. Unfortunately Lieut. Adams-Wylie was ordered to South Africa and has since died of enteric fever in that country. In all 7,577 people were inoculated by him, aided by Dr. Tuke and Dr. Maddock. On the departure of Lieut. Adams-Wylie the station was continued till 1st April on the same scale, kept up by charity supplies of rice, and a ration was issued on the same scale, Dr. Tuke and Dr. Twigg lending their services on the Municipal remuneration scale of Re. 1 for 10 persons inoculated. I obtained funds to pay for this rice issue in every direction. Amongst the chief subscribers were Sir Dinshaw Petit, an anonymous subscription, Mr. N. N. Guzdar's mother, Mr. Damodhar Gordhandas, and some of the leading grain-sellers of the Fort. In a similar manner I obtained supplies for the other inoculation stations of this district, Frere Road, and Colaba Section.

B. Ward,
South.

Elsewhere similar efforts were made. In B. Ward, South, the first attempts were not encouraging. On 2nd October 1899, Lt. Brackenbury wrote :—

“ I have tried inoculating contacts, but with very little success ; the feeling at present is very strong against inoculation. In Koliwada I inoculated one of my coolies in the presence of some Koli fisher people, and then asked them to be inoculated. One man came forward and was quite willing, but his womenfolk rushed up and tried to take him away. But he persisted, when the women became so frantic that I did not think it wise to detain him. Two or three days later I was speaking to the heads of these very same kolis and they said they had been thinking about it, but had now quite given up the idea.”

Strange as it may seem, these illiterate people were influenced in their decision, as they said themselves, by the publication of anti-inoculation articles in the Native Press. Lt. Brackenbury was very hopeful that the production of a wheat serum, and the extension of the privilege of exemption from detention to Cutch—the home of so many of the high-caste Hindus in Mandvi—would enable him to induce the leaders of the various castes, and then gradually the whole population, to accept inoculation. A wheat serum was produced, but the religious objections to the ordinary serum had by that time died a natural death ; the privilege of exemption was also extended to Cutch : but neither of these factors produced any real effect.

A large meeting of Lohanas, Banias, &c., was held in Mandvi about October 15th, under the presidency of Rao Bahadur Vassanji Khimji. It was eloquently addressed by Dr. Ismail Jan Mohamed and Rao Bahadur Vassanji Khimji ; and at the conclusion of it some 132 persons were inoculated, including Rao Bahadur Vassanji Khimji, Rao Bahadur Karamsi Damji, Rao Bahadur Keshawji Nathu Saelor, Dr. Dosabhai Sethna ; but the meeting bore but little fruit and among the Bania, Bhatia, and Lohana castes of Mandvi only about 20 operations were performed during the year.

Rather more success was attained among the coolies working in the godowns and docks ; these men earn from as. 12 to Re. 1 per diem ; their work is heavy manual labour, and, as the local reaction and stiffness of the arm after inoculation was likely to incapacitate them for one or two days, it was expected that no large number would come forward : the offer of 4 as. by way of compensation being obviously inadequate. Various gentlemen, however, contributed grain as an additional inducement. Among them may be mentioned Rao Bahadur K. N. Saelor, Rao Bahadur Karamsi Damji, Rao Bahadur Vassanji Khimji, Rao Sahib Vassanji Trikamji, Rao Sahib Gopaladas Khushaldas, and Messrs. Keshavji Kooverji, Morarji Nensi, Ranchordas Vandravandas, Purshotam Rutransi, and Dharsi Khetsi. The District Officer, with Dr. Mathai, used to visit the docks three times a week and altogether over 5,000 labourers were inoculated. The offer of grain collected beggars from all parts of the city and was eventually discontinued.

The Mahomedans of this district, as elsewhere, maintained that inoculation was against their religion and would have none of it.

Khan Sahab David Solomon had a most successful meeting among the Beni-Israel community, of which 100 people were inoculated. On this occasion the Khan Sahab gave to every person who came forward one rupee.

**B. Ward,
North.**

Captain Brownrigg interested himself in B. Ward, North and at a successful public meeting in Dongri on 1st October, where a crowded audience was addressed by Dr. Sir Bhalechandra Krishna, Dr. Ismail Jan Mohamed and others, 28 people, including Rao Sahib Balkrishna Bhivaji, Messrs. G. Moses, Jacob Moses, Shivram Vithal, and Morarji Krishnaji, were inoculated, and the proceedings were only terminated by darkness. A similar meeting was held shortly afterwards in Umarkhari. Rao Bahadur V. C. Vandekar exerted his influence in the matter and was most helpful; while Rao Bahadur K. N. Saelor, Sirdar Casim Haji Mitha, Khan Sahab Saleh Mohamed Ibrahim, and Rao Sahib Balkrishnaji Bhivaji greatly assisted the movement by contributions of grain and cloth to tempt the backward. A few lotteries with small prizes of grain and cloth were also held with fairly successful results. The volunteers generally did their best in the matter, and on Nowroji Hill, North and South, Rao Sahab Balkrishnaji Bhivaji, Messrs. Shivram Vithal Kandalkar and Gaupat Vithoji, managed to persuade a large number of the residents to get themselves inoculated. Altogether about 10,000 people were inoculated in this district and about half of these were people from infected houses.

D. Ward.

D. Ward, where are to be found a large number of educated Hindus, was the most backward of all. No public meetings were held here and few of the volunteers exerted themselves in the matter; but Mr. P. B. Joshi, K. S. G. H. Rogay, Dr. Framji Shapurji, Dr. Ghaswala, and the two Drs. Naik and Vaid Laxmidas worked hard, visiting various chawls and mills and endeavouring to persuade the poorer classes of the value of the protection. Handbills were freely distributed, and Mr. P. B. Joshi rendered special assistance in writing and translating them into the vernacular. Among others, Mr. Nanabhai, Manager of the Petit Mills, and Mr. Muncherji Framji, Managing Trustee of the Irani Dharmasala, got a number of the people under their control inoculated, while Mr. Amirudin Tyabji and Mr. Haji Mohamed are bright examples of landlords who insisted upon the tenants of their chawls protecting themselves by the prophylactic treatment. In all between 3,000 and 4,000 operations were performed in D. Ward.

Eyculla.

In E. Ward, Eyculla, between 8,000 and 9,000 people were inoculated, the greater part being people from infected houses who preferred inoculation to going to camp. Mr. James MacDonald, Rao Bahadur D. H. Barde, and others encouraged waverers by gifts of grain, and Mr. MacDonald exerted his influence with conspicuous success in Gujri Bazaar, where he induced 1,291 people to get them-

selves inoculated. Special mention must also be made of the efforts of Mr. N. Wadia, Manager of the Bomanji Petit Mill in Clerk Road. He started inoculation on his own initiative among the mill hands, and no fewer than 1,579 were operated on. No public meetings were held in Byculla.

Wari Bandar.

In E. Ward, Wari Bandar, between 10,000 and 11,000, mostly Marathas, were inoculated; Mr. George Lund, Khan Saheb B. R. Ashburner, and Sirdars Casim Haji Mitha and Umar Jumal, materially contributed to this result by gifts of grain and clothing; several Mill Managers did their best to get their mill hands inoculated, and notably the managers of the Alexander Sassoon and the E. D. Sassoon Mills offered 3 days' full pay to those of their employes who might be temporarily incapacitated from work. There is a considerable Goanese population in this district, but a meeting summoned by the Vicar and presided over by Dr. Rozario, proved ineffectual to overcome their reluctance to undergo inoculation. On the other hand, there was no difficulty in persuading the members of a Chinese Club in Mazagon.

E. Ward, West.

In E. Ward, West, Lieutenant Haworth interested himself greatly in this matter and was ably assisted by 3 of his volunteers, Messrs. Desai, Moos, and Daruwala. Constant visits were paid to various chawls throughout the district, and every endeavour was made to bring the people round to see the advantages of the prophylactic treatment. Leaflets were published and employers of labour were approached, with a view to securing their co-operation. A public meeting was held under the presidency of Rao Bahadur Ellapa Balaram; and both the President and Mr. Narsingrao Saybu, a leading Telagu citizen addressed those present, strongly advocating the treatment. At the conclusion of the proceedings Mr. Narsingrao Saybu, Dr. Kapadia, and some 30 others were inoculated. Lieutenant Haworth was himself publicly inoculated in the presence of a number of Wagriss, Mhars and Wanjaris in Foras Road, and in this way succeeded in overcoming their fears and a considerable number of these classes afterwards underwent the operation. Among those who in this district gave grain to distribute among the poorer classes, as an inducement to inoculation, must be mentioned Sirdar Casim Haji Mitha, Rao Bahadur Ellapa Balaram, Rao Saheb Manuji Ragooji, Rao Bahadur K. N. Saelor and Messrs. Narsingrao Saybu, Bomanji Shivaji, Appaji Sadarsi, Mulloo Jilkar, Ragu Babaji, Lowji Meghji, and Vaid Erapa Pattaya. Sardar Casim Haji Mitha and Rao Saheb Manuji Ragooji also made gifts of clothing.

F. & G. Wards.

As regards the remaining District, F. and G. Wards, Captain Boileau writes as follows:—

The total number of people inoculated in this district from 3rd September to 26th May is 17,733, and I believe I am right in stating this district to be 3rd highest on the list in numbers inoculated.

This success has chiefly been brought about by the following methods :—

1. Public meetings.
2. Individual efforts of Plague Volunteers.
3. „ „ „ Staff.
4. Pecuniary and other aid.
5. Touts.

(1). Public meetings were held at Naigaon and Mahim and Parel, and had excellent results and materially aided the starting of the whole scheme.

(2). Amongst those who are prominent as having used their influence in getting people inoculated in this Ward are :—

Rao Bahadur V. Khimjee.

Sir Bhalchandra Krishna.

Dr. Jan Mahomed.

Rao Saheb N. Dalvi.

Mr. J. F. Madan.

„ W. R. Jayaker.

„ Purshotam Naranji.

„ Goculdas Naranji.

„ K. N. Mahale.

„ Pragji Dharmaji.

„ N. Moroba.

Munshi Ebrahim Dadoo.

Dr. Dordi.

„ D. A. D'Monte.

„ S. S. Batliwalla.

Mr. Vishwanath Parburam.

Mr. Dossabhoy Maneckjee Wadia, Manager of Century and Textile Mills.

„ Nasarwanji Nowroji Wadia and Staff, Manager of Dinshaw Petit Mills.

Mr. Ratilal Popatlal, Manager, Lord Reay Mills.

„ Thakarsi Narayen „ National Mills.

„ John Ramsden „ Saraswati Mills.

„ E. H. Barnes „ Kohinoor Mills.

„ Reid „ Bombay Dyeing Mills.

(3). The Staff were equally energetic in holding forth on every occasion, when they could get a few people together, on the beneficial effects of the prophylactic, and by this means did a great many inoculations. The usual method employed was—the S. M. O. went to a mill or chawl and asked the manager or bhaya if he could say a few words to the people. In every case assent has been given, and with 2 or 3 exceptions this method has always been most successful.

Those mills below mentioned have shewn the utmost aversion to allow the introduction of inoculation into their midst, and this has chiefly been brought about by the managers and agents.

1. Morarji Goculdas Mill, Suparibag Road.—I visited this mill several times and endeavoured to bring the people round. I was always greeted with groans on arrival and departure. The manager was willing, but the agent was very much against the measure and I could do nothing.

2. Jacob Sassoon Mill, opposite to Morarji Goculdas.—Manager was inclined to be favourable, but the mucedums were against it and I only did one inoculation.

3. Lukhmidas and Queen Mills, Star of India Mills, Gold Mohur Mills, and many others.—All refused to allow inoculation chiefly on account of the attitude of the managers.

4. The B. B. & C. I. Workshops were most marked in their refusal to have anything to do with the serum. However it is a fact that many people in these mills were afterwards done in chawls and at sub-divisional offices, and I do not think that next season we shall have half so much trouble with the mills.

(4) Under the head "Pecuniary and other aids," may be mentioned the four annas given by Government and the help received from the Volunteers. Amongst those prominent in this Ward as having given rice, etc., to aid inoculation are the names of the following gentlemen, whose assistance in this direction has been of the greatest value :—

Rao Bahadur V. Khimji.
 Rao Saheb N. Dalvi.
 Bai Bhikaijee Jehangir Hormusjee.
 Mr. Sorabjee Dadabhoy Hormusji.
 Khan Saheb Shaik Adam Esooffbhoy.
 Mr. Jeejibhoy B. D. Jeejibhoy.
 „ Nowrojee H. Cooper.
 „ Ardesir H. Kaka.
 Dr. S. S. Battliwalla.
 Mr. R. R. Bhosla.
 „ Jetta Maharaj.

Touts have been used to a certain extent in this section, and Dr. Tavaria made good use of one or two men who gathered in many to his inoculation office. In Naigaon I found one Gopal, a Registration Ramosee, most useful and he brought many to be inoculated. Elsewhere the practice was not much resorted to, but I think it is good and shall make more use of it next year.

Inoculation was started in this Ward in the beginning of September 1899, when Rao Bahadur V. Khimji interested himself in the subject and with the assistance of his Committee began to preach inoculation to the people of Dadar and Naigaon.

Messrs. Procter, Gawthorn and Barnes, of the Kohinoor Mill, and Messrs. Purshotam and Goculdas Naranji, of the Union Mill, aided all they could in inducing their Mill hands to listen, and on the 23rd September a large meeting was held at the Union Mill. Rao Bahadur V. Khimji, in the chair, addressed the meeting at great length and ended his harangue by getting his son inoculated before all, stating he himself would get inoculated in Mandvi. The effect was so good that about 200 people were done on the spot, including Messrs. Purshotam and Goculdas Naranji, Mr. Narsi Kesavji and family, Mr. Khetsi Khajasi, Mr. Meghji Khetsi, Mr. Dewji Khetsi, Mr. Jethabai Narsi, Mr. Serewalla and family, Mr. Jayekar, Mr. Madan, Mr. M. Vassanjee, Dr. Dadarker, Dr. Bhatt, Mr. B. D. Wacha, Mr. M. D. Wacha and Mr. Manek Patel, and other important leaders of the people were inoculated next day at Rao Bahadur Vassonji Khimji's bungalow.

The next meeting was held at the Kohinoor Mill, when, thanks to the good example set by Messrs. Procter, Gawthorn and Barnes, agents and manager, about

100 people were inoculated, and from thenceforward people came forward voluntarily even in the chawls of the section, and the success of the Committee's work was assured.

The Rao Bahadur then turned his attention to Mahim, where we organised a meeting at which the leading residents of Dharavi, Agar Bazaar, Mahim, and Worli, etc., were present. Sir Bhalchandra Krishna, Dr. Jan Mahomed, and Rao Bahadur V. Khimji all spoke at length and much good was done; several doctors, including Dr. Dordi, and many influential native gentlemen and about 80 people were inoculated. This had its effect, though not to such an extent as elsewhere, as inoculation has never really "caught on" in Mahim subdivision. Mr. Mahale also called a meeting in Mahim Bazaar and did much good there; also Mr. Pragji, who was instrumental in getting many people inoculated in the same place.

In Worli Mr. V. Acharya and Mr. Moreba exerted themselves so much that they were enabled to get the whole (barring four people) of Maharwadi (a very badly-infected place in former years) inoculated; of these four un-inoculated people two died of Plague; and of those inoculated not one single person died.

In the Dadar side of this subdivision Mr. D. N. Wadia, of the Textile Mills, gave me great assistance and I was able to inoculate the whole of his mill, or about 900 people, the result being absolutely no case of plague in his mill chawls, which last year were very badly infected. Many famine-stricken people, in fact nearly all who crossed the Bandora Causeway, were inoculated on the spot at the subdivisional office.

In Sion section inoculation was not begun until very late in the year. This section is always fairly free from sickness and plague did not appear till very late, the people not caring about being done until plague showed itself. A beginning was made on the famine-stricken people who came in hundreds to Mr. Dalvi's house every Friday, where rice and the usual 4 annas were given to each person inoculated. Later on in the season a few Kolis and Agris were inoculated, but, taken on the whole, inoculation was not popular in this section. I think a great deal of this was due to my having a somewhat dilatory Sectional Medical Officer.

In Parel and villages the work of inoculation was entirely left in the hands of Dr. H. K. Tavaria, the Sectional Medical Officer, who has done most excellent work. He began by getting the rent-collectors and *dhayats* together and talking to them, and also visited several mills, including Saraswati, D. Petit, Lord Reay, and National Mills, where he spoke at meetings hastily convened and managed on the spot to get many inoculations. He seemed to have the knack of getting to the right side of his section and has had no trouble whatever in getting large numbers inoculated. He received valuable assistance from Mr. J. B. D. Jeejibhoy, Mr. N. Cooper, Mr. A. H. Kaka and family, and Dr. S. Battliwalla, and also from Khan Saheb Shaik Adam Eusoffbhoy and Khan Saheb D. Solomon in G. Ward. In Coorla Mill most excellent work was done by Dr. Dady Burjor and staff, over 900 hands being inoculated.

General.

The foregoing extracts and remarks give some account of the methods adopted to popularize inoculation. From September to Christmas and later, the District Officers with their Sectional Medical Officers, and the pick of the volunteers, were straining every nerve and spared neither time nor trouble in reasoning with, and preaching to, the people. Meetings, large and small, were organised, pamphlets and leaflets were scattered freely, and parties of leading *vaid*s and *hakims* were taken down to the Laboratory at Parel to see for themselves the methods of

preparation and to satisfy themselves regarding the various objections raised. This seems a proper place to refer to the immense services rendered by Dr. Sir Bhalechandra Krishna to the cause of inoculation. The letters, pamphlets, and lectures published by him constituted a valuable addition to the literature on the subject. They were translated into various languages and widely distributed, and they afforded an armoury of weapons to those who had to meet the arguments of opponents. His advice was always at the disposal of the Municipal Commissioner and the whole weight of his influence was thrown on the side of the prophylactic treatment. Mention must also be made of Dr. Ismail Jan Mahomed. He was a constant speaker at the various meetings, and his wide practice and well-known presence gave additional weight to his utterances. The services rendered by the numerous other helpers have already been described. Those of Rao Bahadur Vasanti Khimji, Dr. C. H. B. and Mrs. Adams-Wylie, Mr. N. N. Gazdar, Rao Saheb Purshotam Udhawji, Mr. Vassanti Purshotam, Mr. Parbhuram Vaidya and his son Dr. Poput Parbhuram, Dr. Purshotam Harichand, Dr. P. J. De Souza, Dr. A. G. Viegas, Messrs. Vasantrao and Wamanrao Nana Moroba, and Khan Saheb Bhikaji Rattonji Rana, Mr. Sitaram Yeshwant Dabholkar, Rao Bahadur Dhakhji Kashinath, Dr. Bezonji Kapadia, Rao Bahadur G. H. Nadkarni, Messrs. Yeshwant Thanaji and Gajanan Ramchandra, Mr. Lilaumwala, Mr. Rustomji Merwanji Master, Rao Saheb Mallooji Narsooji, Rao Saheb Kashinath Moorkar, Rao Saheb Mulji Narayan, Mr. Vithaldas Jivandas, Rao Saheb D. K. Desai, Khan Saheb A. F. Moos, Khan Saheb P. C. Daruwalla, Mr. Gopinath Atmaram, Khan Saheb David Solomon and Sirdar Casim Haji Mitha, Khan Bahadur Samuel Isaji, Dr. Fazal Ahmed and Mr. C. J. Clark, Khan Bahadur Hakim Mahomed Dyem, Mr. Abdul Rahiman, Mr. Mahomed Hussain, and Khan Bahadur Abdul Razzak bin Curtas, referred to in the preceding pages, merit special mention.

Inducements
offered.

Apart from the appeal to reason, the inducements offered to the people were as follows :—

- (1) Freedom from eviction.
- (2) Four annas, if poor, as compensation for discomfort and inability to work.
- (3) In cases where pain or fever were abnormal, further assistance was rendered from the discretionary relief funds.
- (4) When available, rice and sometimes clothing provided by charity, was distributed to the poor at the time of inoculation.

In addition half an anna per head was for the greater part of time allowed to touts who succeeded in inducing people to come up for inoculation; and Government sanctioned the printing of the following concessions on the back of inoculation passes :—

1. This certificate is effective for six months from date of inoculation.
2. The proper holder is exempted from detention at plague observation camps except for such period as may be required to disinfect his baggage and clothes if these are considered suspicious.

3. He is exempted from being sent to camp if evacuation or segregation is ordered, but, if Plague occurs in his house, it will have to be disinfected as usual.

4. The above exemptions do not apply to any one actually suffering from plague.

5. Para. 2 applies throughout British India ; para. 3 applies in the Bombay Presidency only.

6. Nothing in the above affects the special Plague regulations for Mahableshtar and Matheran.

difficulties.

During the earlier period of the campaign the principal obstacles were found at first in an utter want of interest in the subject. Gradually, as the public were stirred up by the numerous meetings, opposition followed the lines of (1) disbelief in the protective effect of the prophylactic ; (2) fear of possible ill consequences either immediately or after the lapse of months and years ; (3) objections on religious grounds from the Mussalmans and orthodox Hindus. A considerable section of the vernacular press took up an attitude strongly opposed to inoculation, and, though there can be no doubt that these writings deterred many from protecting themselves, opposition of this kind is not to be altogether deplored, as criticism, whether honest or dishonest, always tends to the elucidation of the truth. With the exception of the Khojas, who, under the healthy influence of their enlightened leader H. H. the Aga Khan, took more readily than any other community to inoculation, the Mussulmans as a whole never budged from their position that inoculation was against religion. They were not open to reason on the subject and the number of them inoculated was almost a negligible quantity. The Bohras, perhaps, would have taken to it if they had suffered severely from plague. So far as the orthodox Hindus went, the objection on religious grounds, which at one time threatened to become a burning question, gradually disappeared. Several of the leaders of these castes (Brahmins, Jains, Bhatias, Lohanas, &c.) were inoculated, but no impression was made upon the bulk of them. Fear of imaginary ill consequences gave place to a keen appreciation of the real discomforts of the operation, with its supervening malaise and fever, and disbelief in its protective effect was superseded by a disinclination to undergo these discomforts for the sake of protection not absolutely guaranteed, and only promised for a limited period. In these objections there is nothing unsound, and they can only be met by improvements in the prophylactic fluid.

The choice between evacuation and inoculation was the most powerful inducement that District Officers were able to use ; and great numbers of people living in infected houses, who would otherwise have had to go to camp, accepted inoculation without liking it, and without believing in it, simply as the lesser of two evils ; but the bulk of those operated upon consisted of the poor and destitute—the classes most liable to plague—who voluntarily submitted themselves to the operation for the sake of the four annas dole and the charitable grant of grain. In especial almost all the Kathiawari famine refugees were inoculated almost as soon as they reached the city.

The attitude of the Parsees towards inoculation during the year under report was in curious contrast to that previously adopted by them. Last year, with the exception perhaps of the Khojas, no community showed a greater readiness to adopt the treatment : this year the Panchayet spared no pains to keep the Parsee public well-informed and interested in the subject, but, though there was some promise for a brief period that they would take to it again, they would, generally speaking, have nothing to do with it.

Now and again the constant strain of argument was relaxed and people came forward voluntarily. Here is an extract from Captain Cuppage's report for the week ending 23rd December 1899 :—

"About 25 persons came of their own accord from Picket Lane near Carnac Road to the office to be inoculated. While writing this report I had a visit from Rao Saheb Purshotum Odhowji, who was present when inoculations were being performed this morning in Tara Naikin's Wadi. Ninety-eight persons were inoculated. He assures me the people came to him—told him that they saw for themselves how the inoculated were keeping free from Plague, and that the fresh cases occurring in the Wadi were all either amongst new arrivals or those of the inhabitants who had refused inoculation. They actually asked to be inoculated."

In Kumbharwada, too, the people began to see that there was something in inoculation and one or two chawls came forward voluntarily. Here and there landlords insisted upon their tenants being inoculated, and in most cases this was due to their appreciation of the fact that, if all the inmates of a chawl were inoculated, plague was not likely to put in an appearance, and that even if a few cases did occur they would not be followed by evacuation of the chawl and loss of rent to themselves.

Precautions
adopted.

In order to ensure the adoption of proper precautions the following circulars were issued :—

*Antiseptic and other precautions to be taken by Inoculators
when using Haffkine's Plague Prophylactic.*

1. Any bottle of the prophylactic found to have the seal broken, the cork loose, or the bottle cracked or broken, is to be sent back to the Laboratory and the contents are not to be used.
2. Exposure of the bottles to day-light is to be avoided as much as possible.
3. Each bottle before opening is to be well shaken, and the contents are to be well mixed up each time the syringe is filled.
4. In opening the bottle the sealing wax or paraffin is first to be melted over the flame of the spirit lamp. The forceps are to be sterilized by passing them several times through the flame of the spirit lamp. The cork is then withdrawn with the sterilized forceps, both arms of the forceps being pushed in between the cork and the neck of the bottle on opposite sides to avoid breaking the cork.
5. The syringe before being first used should be kept filled with a 5°/o solution of Carbolic Acid for twenty-four hours. Before each batch of inoculations the syringe should be filled with a 5°/o solution of Carbolic Acid for one hour. After each batch of inoculation the syringe should be washed out several times with a 5°/o solution of Carbolic Acid.

6. When a bottle has once been opened a clean glass or beaker should be inverted over it to keep out dust and flies. Any contact between the mouth of the bottle and any unsterilized object is to be carefully avoided. Should such contact occur the mouth of the bottle is to be passed several times over the flame of the spirit lamp and thus sterilized.

7. When filling the syringe keep the bottle as horizontal as possible.

8. The needle of the syringe should be sterilized after each patient has been inoculated. Particular care is to be taken in this matter. This may be done in several ways. Some inoculators dip the needle into Carbolic Acid (strong solution) and wipe the outside with a piece of cotton-wool soaked in strong Carbolic Lotion. Others dip the needle into absolute alcohol. A 10°/o solution of Carbolic Acid in spirit is suggested for this purpose. If preferred the needles may be boiled in distilled water before use. Medical men carrying out inoculation should examine each patient for any signs of scrofula, leprosy, tubercle, syphilis, or other disease. In such cases he will, in addition to sterilizing the needle as above described, pass it a few times through the flame of the spirit lamp, first disconnecting the needle from the syringe to avoid any of the prophylactic remaining in the needle. Needles not in use should be kept in a solution of Carbolic Acid (5°/o) until required.

9. The injection is a hypodermic injection. Care is to be taken to inject under the skin: not into the muscle. If care be taken in this matter the patient will suffer the minimum amount of pain. In cases where patients have been inoculated into the muscular tissue the swelling and pain have been excessive.

10. The dose to be given to an adult man is noted on each bottle. For weakly people the dose should be reduced. For women the dose is $\frac{4}{5}$ ths, the adult man's dose. A child of 10 gets $\frac{2}{3}$ ths of an adult dose; a child of 3 years gets from $\frac{1}{15}$ th to $\frac{1}{10}$ th of the adult dose. The dosage on each bottle should in all cases be carefully noted.

11. A bottle once opened, the contents should be used up at once or the rest of the contents thrown away. It is never to be recorked for future use. Empty bottles are to be collected and returned to the Laboratory.

*Rules for the use of Hypodermic syringes in the Inoculations against
Cholera, Plague or Typhoid.*

I.—A new syringe, or one which has not been in use for some time, must be kept soaked in a 5 per cent. solution of carbolic acid for 24 hours before using it for inoculation purposes.

This is to be done in the following manner:—

Ascertain whether the needle is patent by passing a wire through it (a bundle of wires is enclosed along with the syringe). Fix the needle firmly on the nozzle of the syringe by means of pliers or strong dissecting forceps. Fill the syringe up to about $\frac{1}{4}$ with the disinfectant solution and draw back the piston rod entirely, so as to have the syringe partly filled with solution and partly with air. Shake the syringe briskly, so that the solution may touch every part of the barrel and wash away any impurity which may be sticking to the piston. Remove the needle by means of the pliers, then squirt out the liquid, and fix the needle on again. Repeat

the procedure again three or four times, after which the whole barrel is to be charged with the lotion, and the syringe kept in this condition for the number of hours prescribed above. The lotion is finally removed from the syringe just before beginning work.

II.—If the syringe be kept unused for some time, the plunger is apt to dry up and not to fit the syringe any more ; or, on the contrary, it may stick to the barrel, and get damaged when attempt is made to open the syringe again. To prevent this, every time the work is to be interrupted for several days, the metal frame of the syringe is to be unscrewed, and the glass barrel, *with the piston remaining in it*, withdrawn from the frame. A drop of vaseline is then put in front and behind the plunger, the glass barrel replaced in the metal frame, the latter screwed up again, and the piston well-oiled with the vaseline by moving it in the barrel several times forward and backward. Before, however, replacing the barrel into the frame, in case the syringe bears a leather piston, the leather ring to be found at the bottom of the metal frame is to be taken out cautiously, so as not to cut or tear it, and turned upside down : otherwise the syringe will afterwards leak between the glass barrel and the metal frame. On no account should the piston be withdrawn from the glass barrel as the operator is liable to damage it, and occasionally to break the barrel, when trying to replace the piston into the barrel back again. The metal frame is to be screwed together tightly, but not too much so, as the barrel is apt to crack in a too tight frame. In some syringes with rubber plungers in them, an arrangement is made whereby the plunger can be tightened or loosened without removing the piston from the barrel. This is done either by turning a screw to be found on the top of the piston rod ; or, on the contrary, by fixing the screw underneath the plunger, that keeps it in position, on to a protuberance in the far end of the syringe, and then turning the piston rod itself. The details will be seen by an inspection of such a syringe ; attention is only drawn here to that kind of syringe in order that the operator, by manipulating the screw or piston rod, should not inadvertently tighten or loosen the plunger beyond the desired degree.

III.—Every time the whole syringe has been unscrewed and opened, it should afterwards be cleaned and sterilized as if it was a *new* syringe, that is, by rinsing and keeping it soaked in carbolic acid for 24 hours before being used again.

IV.—When the plunger gets in any way damaged, the syringe should be sent to the Laboratory for repairs, rather than spare plungers be indented for, as barrels differ slightly in diameter, and, on the other hand, plungers change in size in this country, and do not fit the syringe unless specially selected each time.

V.—While filling the syringe with the needle on it from a glass or any other vessel, it is very essential to avoid even momentary contact between the *point* of the needle and the surface of the vessel, as otherwise the point, which is very thin, gets bent immediately, and the act of injection becomes from that unnecessarily painful to the patient. But there is no objection in applying to the surface of the vessel the oblique opening of the needle, which is even recommended when sucking up into the syringe the last drops of material remaining in the tube or bottle.

VI.—The plague prophylactic or cholera vaccine should be absorbed into the syringe directly from the test tube or the bottle in which the fluids are prepared or supplied ; that is, the material should on no account be poured out, for convenience sake, into another vessel.

VII.—The bottle or test tube containing the material should always be shaken anew before absorbing it into the syringe. While filling the syringe, the operator holds the barrel in his left hand and introduces the needle, with its oblique opening

downwards, into the fluid which has been tilted near to the mouth of the tube or bottle by an assistant ; and with the right hand draws out the piston and sucks the fluid up into the syringe. During this process the oblique opening of the needle may be kept resting upon the glass of the vessel, but without pressing upon it. The assistant, by gradually lifting the far end of the tube or bottle, is to so regulate the flow of the fluid that the needle point remains constantly bathed in it ; and, as he is doing so, the operator slowly lowers his right hand which holds the head of the piston, thus keeping the same relative position of the bottle and the syringe ; otherwise the point of the needle, or even the needle itself, is apt to get bent.

VIII.—During the sucking-up of the fluid, the barrel of the syringe and even the nozzle of the needle must not be allowed to come in contact with the mouth or the contents of the bottle.

IX.—When the piston is drawn up to the uppermost point, all bubbles of air should be emptied from the syringe by holding it up vertically with the needle upwards, and gently pressing on the piston head from below.

X.—The operator should carefully avoid wasting the prophylactic fluid. The contents of every tube or bottle should be used up to its last drop before another is opened, unless no more patients are present to be inoculated ; in which case the contents remaining in the bottle should be thrown away, and not kept over to the following day.

XI.—When the inoculation work is over for the day, it is important that the syringe should be washed carefully with carbolic lotion again in the manner detailed in paragraph I. Otherwise it is liable to get solid matter deposited on its inner walls, and also to get infected. The needle should be dried and touched on the outer surface with a trace of vaseline to prevent its getting rust-covered, and a wire should be passed and left in it. A rust-covered needle is cleaned on a sharpening stone. When the syringe is being used daily, and only for inoculation of the same prophylactic material, it is sufficient, when beginning work on the following day, to wash it out with carbolic lotion as mentioned in paragraph I, and to keep it soaked with the lotion for half an hour or so.

XII.—The following is the technique for hypodermic injection in men. Put the stopper on the piston rod of the syringe so as to mark exactly the dose to be injected. Hold the barrel of the syringe in your right hand, between the middle and ring fingers on one side and the thumb on the other, and place the index finger on the head of the piston rod, without pressing upon it. Pick up with your left hand, between the index finger and the thumb, a fold of skin where the needle is to be inserted, avoiding carefully big subcutaneous vessels. Make a stabbing puncture with the needle into the skin, *parallel* to the length of the fold, and so as to inject strictly subcutaneously (on no account into the muscles) remove the hand holding the fold, and press the piston rod home. Withdraw the needle by a rapid movement, and only then apply a finger to the point of the skin where the needle had been inserted, and press upon it for a few seconds to prevent the fluid, or a drop of blood, oozing out of it. In case a drop of blood does come out after the needle, a thin layer of clean cotton-wool should be applied, for a minute or so, over the opening.

Circular.

In addition to the precautions laid down in the Circulars regarding Inoculation, forwarded with this office No. P-6472, of 19th September 1899, and No. P-6846, of 28th September 1899, the following should in future be adopted :—

- (1) The place of inoculation should first be cleaned thoroughly with carbolic acid solution.

- (2) Collodion should also be applied at the point of inoculation, subsequent to the operation, for the purpose of sealing the wound made by the needle.

The utmost care should be taken to see that all the precautions laid down are carefully complied with.

At a later date the above were supplemented by the following instructions drawn up at the Laboratory.

Instructions for the use of the Plague Prophylactic.

1. Parcel to be opened and unpacked carefully. Any bottle found open, cracked or with the covering of the cork damaged, is to be sent back to the Laboratory without being used. Prolonged exposure of the prophylactic to daylight is to be avoided.

2. The prophylactic is to be given by injection under the skin. For this purpose a hypodermic syringe of a suitable size is to be disinfected, in the beginning, by keeping it filled with a 5 per cent. solution of carbolic acid for 24 hours. After that, if the syringe is not used for other purposes, it will be sufficient to keep it filled for one hour before commencing operations. After the completion of each series of injections the syringe is to be washed out three times with the same antiseptic solution. The needle should be sterilized by boiling in a test tube before use, or should it by chance fall on the ground during the operations. Between each inoculation the needle should be kept immersed in carbolic lotion (1 to 20), which may conveniently be contained in the upturned lid of the metal syringe-case. Syringes may be obtained from the Plague Research Laboratory, Parel, Bombay.

3. Each bottle before being opened is to be shaken, and the contents well mixed up each time before being absorbed into the syringe.

4. When opening a bottle a pair of dissecting forceps is to be used, the branches being heated beforehand in the flame of a spirit lamp, and guarded from contact with any other unsterilized object.

5. While opening a bottle the mouth of it is passed several times through the flame of a lamp, and the paraffin melted. The cork is then withdrawn with the sterilized forceps, both branches of which are shoved in between the cork and the neck of the bottle, on two opposite sides simultaneously. In the case of bottles closed with India-rubber stoppers no paraffin or other covering is used. The stoppers are easily withdrawn by the sterilized forceps. After the bottle is opened any contact between its mouth and other unsterilized objects is to be avoided; and, if contact inadvertently occurs, the mouth is to be heated again in the flame for disinfecting it. The contents, or a part of it, are absorbed into the syringe. The bottle is to be kept as nearly horizontal as possible during the whole time the cork is out. Leaning the neck of the bottle against the edge of the box-lid will be found convenient.

6. For an adult man, in average state of health, the standard dose is $2\frac{1}{2}$ cubic centimeters (15 minims counting for 1 c. c.). This is to be injected under the skin of the back of the upper arm, preferably the left one, avoiding as carefully as possible the muscles or the big vessels by entering the needle in a sloping direction (never at right angles).

The following table shows at a glance the proper doses to be given to persons in good health :—

If the dose marked on the bottle is—

			2.5c.c. then give	5c.c. then give
Below 2 years	...	...	0.5 c. c. or $\frac{1}{5}$ full dose	1 c. c.
From 2 to 5 years	...	...	1.0 c. c. or $\frac{2}{5}$ „ „	2 c. c.
„ 6 to 11	„	..	1.5 c. c. or $\frac{3}{5}$ „ „	3 c. c.
„ 12 to 15	„	...	2.0 c. c. or $\frac{4}{5}$ „ „	4 c. c.
„ 16 to 50	„	...	2.5 c. c., full dose	5 c. c.

Women of all ages over 12 years should get 0.25 c. c. less than men of corresponding ages.

Persons over 50 years old should get 0.25 c.c. less for each decade above that age.

Children stand the treatment well and no fear need be felt in giving these doses. The symptoms commence as a rule 3 to 5 hours after inoculation, and consist chiefly of swelling and pain at the seat of inoculation, and of a rise of temperature. The pain is felt particularly on movement of the part. The fever is accompanied by general discomfort usual to this condition. No treatment of the symptoms is required beyond applying ice for the relief of headache, if any is felt, and taking some rest. General symptoms subside after 24 to 36 hours; the pain at the seat of inoculation lasts for three or four days, disappearing gradually; a painless induration remains there for some time longer. It is desirable to produce a rise of temperature of at least 102° F. If the reaction is less marked, the operation may be repeated 3 or 4 days later, with the same or an increased dose, according to the result of the first inoculation. There is no harm in leaving a longer interval between the two inoculations. Note carefully the instructions on the label of each bottle and attend to any directions on it for increasing or diminishing the amount to be administered.

7. No changes in diet or occupation are necessary beyond, if possible, taking some rest. Bathing in the open air should be avoided for some days. A simple purgative may be given 24 hours after the inoculation.

8. The prophylactic material is harmless, and can be thrown about without danger; but it is liable to get infected. A bottle, once opened, is therefore *not to be corked again*, but used up at once, or the rest of the contents thrown away. While a bottle is open, it should be guarded from insects flying or walking into it, or dust falling in, *vide* last sentences of paragraph 5 above. The empty bottles, the boxes, and, if possible, also the material in which they were packed, are to be returned to the Laboratory.

9. In properly closed bottles, and when kept in dark and sufficiently cool places, the prophylactic is likely to retain its power indefinitely.

At the beginning of September the question was raised whether the inoculation of contacts was desirable, seeing that the disease might

already be incubating in them and their attack subsequent to inoculation might be put down to the operation. The opinion of Major Bannerman was asked and his advice, which was acted upon, was as follows :—

In reply to your memo, No. P-6441, of 18th instant, I have the honour to advise that all contacts should be given the chance afforded by inoculation for the following reasons :—

(a) From observations made under exact conditions, *e. g.*, in jails, small villages, etc., it is certain that plague in the incubation stage can be “aborted” by inoculation, provided the operation has been performed 12—24 hours before the appearance of symptoms of plague.

(b) It is also proved that inoculation of a person actually suffering from the fever of plague does not do him any harm, the death-rate among such inoculated persons being the same as in the non-inoculated.

(c) The argument that the inoculation of contacts should be stopped because a certain number of such persons will develop plague is not sound. From practical experience in other parts of India, I know that when the matter is explained to the people, even the uneducated, they at once see the force of the argument and regard such plague cases as being unavoidable, and not therefore detracting from the benefits of inoculation. I suppose the Bombay people would not be more backward to accept this view of the matter than those in other provinces.

It would be a distinct loss, from a humanitarian point of view, to stop the inoculation of contacts who have no fever on them at the time.

On the whole the operators did their work carefully and well. With the exception of a few practitioners of considerable experience, who were compelled to satisfy the Special Medical Officer of their fitness for the responsibility, none but qualified medical men were permitted to inoculate. Cases occurred from time to time where the pain and inflammation at the seat of inoculation, or stiffness of the joint, were prolonged ; but it would be difficult to assert that this was due to carelessness on the part of the operators, especially when it is remembered that the ignorant in spite of warnings constantly rubbed cowdung and other objectionable stuff upon the seat of inoculation. Abscesses, probably due to this cause, occasionally occurred. In a few cases prolonged debility following upon the operation was ascribed to inoculation, and in a few the cessation of rheumatism, malaria, or other ailments, were thought by the sufferers to have resulted from the prophylactic treatment ; but such instances were extremely rare and probably mere coincidences.

Abuses.

Two cases were reported by the Port Health Officer where people anxious to get away by sea obtained inoculation certificates belonging to others and personated the proper holders in the hope that it would facilitate their departure. No means existed for checking this practice except that of examining the thumb-impressions and marks of identification upon the certificate. The practice may have been common, but the above were the only two cases actually reported during the year.

The one serious abuse of inoculation, which it was impossible to check, was the inclination of some of the destitute Kathiawari refugees and other beggars to make a profession of inoculation. They would wander round from station to station getting at each their dole of four annas and the free gift of grain. The strictest injunctions were issued to all inoculating officers to examine carefully the arms of persons coming up for inoculation, to see that they had not been done before, and very large numbers were constantly being turned away ; but all traces of the operations disappeared in the majority of cases within a very brief space, and, careful as the medical officers might be, there is no doubt that several thousands must be deducted from the total number of operations performed to arrive at the actual number of people protected. On one occasion Captain Lock collected some 50 men who had been inoculated, some 15 times each : one of them confessing to as many as 30 operations. In a few of these cases it was possible to detect as many as four indurations, but in the majority of cases one, or at the most two, could be found. None of these people seemed to be in the least affected by their repeated doses. The following Circular was issued with a view to emphasizing the importance of vigilance against this abuse.

CIRCULAR.

It has come to the notice of the Commissioner that in some cases people are making a profession of inoculation : one man admitted having been inoculated 30 times in order to secure the four-annas fee and many others had been inoculated 10 to 30 times each.

The Commissioner has, therefore, ordered in modification of this office Circular No. P-5612 of 25th August 1899—

1. That the certificate to be attached by District Officers or other duly-authorised persons to bills for fees shall run :—

“ Certified that these operations have been performed in my presence, and that none of the persons operated upon have, so far as I can ascertain, been inoculated before *within the past 6 months.* ”

2. Compensation up to a maximum of annas four may be paid only to persons who have not been inoculated before within the previous 6 months.

District Officers are requested to enforce these orders literally and strictly, and I am directed to say that severe notice will be taken if any Medical Officer exhibits carelessness in ascertaining whether or not a person has been previously inoculated.

On another occasion Dr. R. V. Patel sent in 18 certificates of some men he had turned away who had been inoculated some half a dozen times each. Hundreds of people were constantly being thus turned away at the various inoculation stations, but as the indurations disappeared it became impossible to detect whether they had been inoculated before, and the people themselves, realising that they would not be inoculated again and get the compensation they hoped for if they admitted having been treated before, unblushingly denied having ever been operated on.

**Assistance by
Private
Practitioners.**

Most valuable assistance was rendered by private practitioners in the matter of inoculation. They have been marked with an asterisk in the table of inoculations performed, and not only was the number of operations performed by them far from insignificant, but their public-spirited action in this matter—undertaking the work gratuitously—carried a moral influence with it not to be measured by the number of people protected. They influenced their patients, and through their patients the public generally, and their support was of no small value to the District Officers. The enormous assistance rendered by Dr Sir Bhalchandra Krishna has been referred to elsewhere. The following extract from a brief report by Dr. A. G. Viegas speaks for itself :—

Bombay, 27th June 1900.

To

CAPTAIN W. A. CUPPAGE,

District Plague Officer,

“C” Ward.

SIR,

As requested by you I have the honour to submit a brief report of the work done at the Chira Bazaar Inoculation Station from the 9th February 1898 to the 9th June 1900. Before proceeding to give detailed information of the number, age, periods, castes, &c., of the inoculated people, I beg to be allowed to say that at the meeting of the Standing Committee of the 12th January 1898, during the discussion on the best way of popularizing M. Haffkine's anti-plague inoculation in the city, a member suggested to the Municipal Commissioner that, instead of having an entirely paid agency for the work, the Health Officer might be requested to issue a circular letter to private medical practitioners to undertake the work gratuitously at their dispensaries, and he thought that they would cheerfully respond to the call made on them, and that most of the dispensaries in Bombay would probably be stations for inoculation with unpaid operators. The suggestion was acted upon, and in response to the invitation the Chira Bazaar Inoculation Station was opened on the 9th of February 1898.

Messrs. Vasantrao Nana and Wamanrao Nana, sons of the late Sirdar Nana Moroba, most promptly placed at my disposal their nice and furnished hall for the use of the station. They did all the clerical and other work, and also rendered me most valuable assistance in connection with inoculation up to the 7th January 1900, thus obviating the necessity of rented premises and paid assistance. Owing to the prevalence of plague in the immediate neighbourhood of their residence, they left temporarily for Matoonga on the 7th January 1900, and from this date down to the 9th June 1900 the whole work devolved upon my energetic Secretary, Khan Saheb Bhicaji Ratanji Rana; and, had he not come to my rescue, the station would have been closed, for it would have been difficult—nay, I may say without exaggeration, impossible—to find anyone coming forward to devote such a large portion of his time to this work and at such a critical time. As the hall was found insufficient for the large number of persons who came to be inoculated morning and evening, the station was removed to the verandah of house No. 4, Dookerwady, which also belongs to Messrs. Vasantrao and Wamanrao Nana Moroba and they placed it at my disposal. When the tenants of this house returned, I was at a loss to find a suitable place for the station, and, after having been disappointed by two other gentlemen, Mr. Dadabhoj Naservanji Korrwalla, J. P., who has on several

occasions rendered me most valuable assistance in persuading the people of Nana's Wady to get themselves inoculated, and in various other ways, most readily placed at my disposal a part of his shed for the use of the station.

Dr. Gregory M. H. DeSouza rendered me very great assistance for about two-and-a-half months by his regular and punctual co-operation in the inoculation operations. The very laborious work of the compilation of the statements A, B, C, and D has been done by Khan Saheb Bhicaji Ratanji Rana, for which he deserves great credit. Messrs. Vasantrao and Wamanrao Nana Moroba have all along supplied lights, &c., for the use of the station.

Local Reaction.—The pain and tenderness at the seat of the injection in the poorer classes, possibly because they are inured to pain and discomfort, were not so marked as in the well-to-do classes.

General Reaction.—In one case a lad, named Pias, was inoculated at the station in 1898, the temperature rose to 104° F., and it remained high for four days, I described this case fully in the course of a discussion which took place on the able and instructive paper of Sir Bhalechandra Krishna on Plague Prophylactic Inoculation at the meeting of the Grant College Medical Society, of 22nd November 1898, and which was fortunately attended by M. Haffkine; and I then thought that there was yet room for improvement in the preparation of the prophylactic, and that thus some of its undesirable effects, which made themselves manifest in a few cases, might be obviated. In another case (Martin's) muscular pains appeared after inoculation and persisted for about a month, especially in the loins. In a few cases general weakness was complained of, which seldom lasted for more than a week.

Number of persons inoculated.—Out of a total of 19,605, low-caste Hindus numbered 11,507. The inoculated persons have come from almost every district of the city and some of them from the suburbs.

Number of persons refused—7,919 persons were turned away without being inoculated. The refusals were based on the presence of lumps which were found out in them by the operator feeling both their arms before being inoculated; (2) by the identification by Khan Saheb B. R. Rana of persons who had already been inoculated at the station.

In order to bring inoculations performed by private practitioners into line with the work being done by salaried officials, it was arranged that they should work under the general control of the various District Officers, and the following circular was issued :—

CIRCULAR.

To

ALL DISTRICT OFFICERS.

It is necessary for statistical and administrative purposes that a strict control should be kept over all inoculations performed in Bombay. General orders have already been issued in this office Circular No. 5612-P of 25th August 1899. The following supplementary orders are issued with a view to bringing into line the performance of inoculations by private practitioners :—

1. District Officers will submit the names of any private practitioner who is willing to inoculate without remuneration, reporting whether they propose to accept his assistance and stating the time and place where such practitioner will work.

2. Any practitioner whose assistance is accepted must maintain a careful register in the accompanying form, and this register must be open to inspection by the District Officer.

3. He must also submit to the District Officer direct a weekly return correctly compiled in the accompanying form.

4. He will obtain prophylactic fluid, certificate forms, and other requisites from the District Officer.

5. Certificate forms must be kept under lock and key. They must *never* be signed before they are filled in. The impression of the left thumb of the person inoculated and at least one mark of identification must always be given.

The countersignature of the District Officer is not necessary.

6. The District Officer should keep a register of all prophylactic and other requisites issued to private practitioners, obtaining a receipt for every issue.

7. It is impossible to place Municipal Funds at the disposal of private practitioners for the payment of compensation to persons inoculated.

Protection.

One of the most striking cases of the protective value of inoculation, during the year, occurred at house No. 201, Cattle Lines, Pilot Bandar, Colaba. There were 61 people living here and of these 24 were inoculated. The persons inoculated were mostly women and children, the men being generally away at work at the time of the medical officer's visits. In the month of February, the house was violently attacked by plague, 20 cases occurred altogether, and of these 19 were among the 37 uninoculated (a percentage of 51·3), and only one among the inoculated, a percentage of 4·2. The facts of this case were reported to Mr. Haffkine and a detailed investigation was instituted by him. Of the 19 uninoculated cases 12 died and 7 recovered, while the one inoculated case recovered. In another case—that of the Marine Battalion—of 775 persons, all but 75 had been inoculated when plague broke out. Six cases occurred, and of these 3 were among the uninoculated and 3 among the inoculated. The percentage of attacks amongst the uninoculated was, therefore, 4·00 ; among the inoculated 0·42. The facts of this case were also reported to Mr. Haffkine.

Thanks chiefly to the enthusiasm and energy of Mr. N. N. Gazdar, a great number of the inhabitants of Frere Road and adjoining streets were inoculated. The densely-crowded chawls of this locality suffered severely from plague in past years, but escaped comparatively lightly during the year under report, and the District Officer is unable to assign any reason for this, except inoculation.

From several examples of the good effects of inoculation in B. Ward, the case of house No. 31-33, Jail Road (North), may be selected. It is a dirty insanitary building, inhabited by Mhars. It had a bad plague record from 1898, and between 1st May 1899 and 30th December 1899 there were 22 deaths there, of which 4 were plague and 7 suspicious. The majority of the inmates were inoculated on the latter date. Between 5th January 1900 and 28th May 1900 42 deaths occurred in

the house, of which 7 were plague and 9 suspicious. Not one of these deaths occurred among the inoculated, though the locality was a perfect hot-bed of plague.

In C. Ward, among not a few others, Patakwadi and Tara Naikin's Wadi may be cited as good instances of the value of the prophylactic. In house No. 44, Patakwadi, a highly-infected locality, where in the previous epidemic every house had to be vacated more than once, all the people—60 in number—were inoculated during the year under report, except one old woman, who was in too debilitated a condition, and a barber who persistently refused to undergo the operation. No cases of plague were observed here this year, except one which was brought into the house from another ward, and the case of the uninoculated barber mentioned above.

In Tara Naikin's Wadi, the manager of a large chawl was instrumental in getting about 500 of the inmates inoculated—of these only one died of plague some 40 days later. About 500 others, living in the same Wadi under similar conditions, refused to accept inoculation, and among them there were some 20 deaths from plague.

The excellent work done by Lieutenant Browne and Dr. Cama, with the assistance of some of the volunteers, in Kumbharwada has been referred to elsewhere. Lieutenant Browne took the keenest personal interest in the subject, he was closely acquainted with the whole locality, and carefully watched the mortality in the houses where he had succeeded in pushing inoculation. The following table has been extracted from his report, and the results speak for themselves.

	Number of persons inoculated and dates of inoculation.	Cases or deaths from Plague amongst inoculated.	Deaths from all causes, including Plague, amongst inoculated.	Cases or deaths of Plague amongst uninoculated.	Deaths from all causes, including Plague, amongst uninoculated.	REMARKS.
16/150, Duncan Road, . population about 150. (Census return— 95 males, 27 females, 29 children.	66 persons inoculated, 10th Nov. 1899, 3 persons inoculated, 16th Nov. 1899, 16 persons inoculated, 7th March 1900. Total ... 85	Nil ...	1 Luximon Vittoo, 30 years. In- oculated 16th Nov. 1899. Died 8th January 1900 of dysen- tery. Under Dr. Ranina's treat- ment for dys- entery 1 month before death.	1 death, 6th March 1900. 1 death, 6th March 1900. 1 death, 8th March 1900.	11... .. A good many of these were meas- les and 1 or 2 small- pox.	Every adult in the house was inoculated finally, except about 6, who were unfit for it. The house is a villainously bad one, and the smell on the ground-floor is enough to make a ninth cart-driver feel faint.
16/151, Bhandari St. population about 80. (Census return— 39 males, 33 females, 10 children.	21 persons inoculated, 27th Jan. 1900. 11 persons inoculated, 22nd Feb. 1900. 3 persons inoculated, 27th Feb. 1900. Total .. 35	Nil ...	Nil	1 suffering, 28th Feb. 1900. 1 death, 26th Feb. 1900. 1 suffering, 21st Feb. 1900. 1 death, 25th March 1900. 1 death, 23rd Feb. 1900. 1 death, 12th Feb. 1900. 1 death, 17th Feb. 1900. 1 suffering, 17th Mar. 1900.	8... ..	This is a very filthy house. The rooms and staircase are pitch- dark and stink. The whole house was twice disinfec- ted, and for every case certain rooms were cleared also; but, as will be seen, nothing checked the plague except inoculation. Since making up this report, 2 more deaths from plague have occurred amongst the uninoculated, and several more of them came forward for inoculation.

	Number of persons inoculated and dates of inoculation.	Cases or deaths from Plague amongst inoculated.	Deaths from all causes, including Plague, amongst inoculated.	Cases or deaths of Plague amongst uninoculated.	Deaths from all causes, including Plague, amongst uninoculated.	REMARKS.
173, Bhandari Street. Population about 125 or 150. Census return— 83 males, 33 females, 15 children.	8 persons inoculated by Dr. Contractor. 11 persons inoculated, 28th Dec. 1899. 46 persons inoculated, 3rd Feb. 1900. 6 persons inoculated, 6th April 1900.	Nil ...	Nil ...	1 death, 31st Jan. 1900. 1 death, 3rd Feb. 1900. 2 suffering cases, 31st March 1900. 1 death, 5th April 1900.	6...	Since writing this report, there have been two more cases of plague amongst the non-inoculated, but the inoculated still are keeping alright. About 20 more persons have also been inoculated.
	Total ... 71			5	6	
334/336, Duncan Road. Population about 60 or 70.	10 persons inoculated, 2nd Oct. 1899. 16 persons inoculated, 17th Oct. 1899. 3 persons inoculated, 22nd Oct. 1899. 7 persons inoculated, 8th Nov. 1899.	Maroti Tay Appa, female, 30, Mochi, inoculated 2nd Oct. 1899; of plague.	1 ...	1 death, 3rd January 1900. 1 death, 23rd Feb. 1900. 1 death, 14th March 1900. 1 death, 14th March 1900. 1 death, 23rd March 1900.	16...	
	Total ... 36	1	1	5	16	
Patras Chawl, 26-42, 3rd Pathan Street. Population about 350.	94 persons inoculated, 12th Nov. 1899. 5 persons inoculated, 10th Dec. 1899. 53 persons inoculated, 21st Dec. 1899. 9 persons inoculated, 23rd Feb. 1900. 6 persons inoculated, 28th Jan. 1900. 3 persons inoculated, 29th Dec. 1899.	Nil ... Baya Gopal, 30 years, weak Kat h i a w a r woman, inoculated (35 c.c.), 29th Sept. 1899. Died 12th Dec. 1899 of asthma and debility. This woman ought not to have been inoculated, as she was very weak.	1 ...	2 deaths, 28th Dec. 1899. 1 death, 31st Jan. 1900. 1 death, 10th Jan. 1900. 1 death, 19th Feb. 1900. 1 death, 20th Feb. 1900. 1 death, 4th April 1900. 3 suffering cases removed to Mahratta Hospital.	19 ...	This chawl has always had a very bad history. This year it was again very highly infected, but the inoculated kept absolutely free from plague. Another curious thing in connection with the house was that the inoculated people remained free from small-pox, but this was probably only luck.
	Total ... 170			10	19	
304/306, Duncan Road. Population about 125 or 150. Census return— 98 males, 34 females, 22 children.	35 persons inoculated, 23rd Dec. 1899. 7 persons inoculated, 2nd Feb. 1900. 16 persons inoculated, 20th March 1900. 17 persons inoculated, 11th April 1900.	Nil ...	Nil ...	1 death, 1st March 1900. 1 plague death, 17th Jan. 1900. 1 death, 18th March 1900. 1 death, 20th March 1900. 1 death, 1st April 1900. 1 death, 6th April 1900. 1 death, 11th April 1900. 1 suffering case, 11th April 1900.	8 ...	The rooms in this house are filthy, dark, and absolutely no ventilation. The whole house was flushed twice, but nothing appeared to check the plague except inoculation. Since writing the above, there have been 2 more cases amongst the non-inoculated.
	Total ... 75			8	8	
16-18-20, Carpenter Street. Population 120.	13 persons inoculated, 8th Dec. 1899. 23 persons inoculated, 30th Dec. 1899.	Nil ...	Nil ...	1 death, 18th Dec. 1899. 1 death, 11th Jan. 1900. 1 death, 8th March 1900. 1 death, 16th March 1900.	14...	The whole house has been disinfected once, and separate floors several times. All the uninoculated have been sent to camp also twice, but inoculation was the only thing.
	Total ... 36			4	14	
16, Kumoharwada. Population of the first chawl, where we inoculated, 150.	55 persons inoculated 19th Dec. 1899. 9 persons inoculated, 12th Jan. 1900.	Nil ...	Nil ...	1 death, 11th Jan. 1900. 1 death, 8th March 1900. 1 death, 16th March 1900.	12...	Some of these were small-pox and still-born children.
	Total ... 64			3	12	

	Number of persons inoculated and dates of inoculation.	Cases or deaths from Plague amongst inoculated.	Deaths from all causes, including Plague, amongst inoculated.	Cases or deaths of Plague amongst uninoculated.	Deaths from all causes including Plague amongst uninoculated.	REMARKS.
181-181, Kumbharwada. Population about 60 or 80. Census return— 50 males. 27 females. 16 children.	28 persons inoculated, 11th Dec. 1899. 17 persons inoculated, 22nd Jan. 1900. 14 persons inoculated, 3rd April 1900. Total ... 59	Nil ...	Yankoo Lagani; inoculated 6th Oct. 1899. Died 1st Jan. 1900 of cholera.	1 death, 19th Jan. 1900. 1 death, 3rd April 1900. 1 death, 3rd April 1900. 1 death, 16th March 1900. 1 suffering case, 3rd April 1900. 1 suffering case, 3rd April 1900.	10 6 10	A very dirty quarter and badly infected. The inoculated re- mained absolutely immune from plague, as usual.
6, Bhandari Cross Lane. Inhabited by 15 workmen.	4 persons inoculated at the docks. 8 persons inoculated by ns, 9th Feb. 1900. Total ... 12 Leaving only 3 un- inoculated.	Nil ...	Nil ...	1 plague death, 6th March 1900.	1 1	
185, Kumbharwada. Population of nearly 125.	8 persons inoculated in other places. 25 persons inoculated, 7th Jan. 1900. 3 persons inoculated, 24th Jan. 1900. 22 persons inoculated, 24th March 1900. Total ... 55	Nil ...	Nil ...	1 death, 8th Jan. 1900. 1 death, 21st March 1900.	3 3	
336-338, Kumbharwada. 75 or 80 persons. Census return— 24 males. 18 females. 13 children.	40 persons inoculated, 10th Dec. 1899. 19 persons inoculated, 8th March 1900. Total ... 59	Nil ...	(1) Jyabhai Si- dhoo; inoculated 10th Dec. 1899. Died 31st Dec. 1899. Debility.	1 plague death, 5th Feb. 1900. 1 plague death, 21st Feb. 1900. 1 suffering case. 1 plague death, 13th April 1900. 1 plague death, 6th March 1900.	9 5 9	This house came for- ward voluntarily for inoculation.
47-53, Northbrook Street. Population 65 or 70.	9 persons inoculated, 14th Jan. 1900. 1 man inoculated, 25th Jan. 1900. 21 persons inoculated, 14th Feb. 1900. 14 persons inoculated, 23rd March 1900. Total ... 45	Nil ...	Nil ...	3 cases removed, 22nd March 1900. 1 death, 12th Feb. 1900. 1 death, 25th March 1900. 1 death, 28th March 1900.	10 Several of these were children. 6 10	
49, Northbrook Street. Population about 25.	7 persons inoculated, 16th Jan. 1900. 3 persons inoculated, 24th Jan. 1900. Total ... 10	2 Bala Genoo, 30 years, inoculated 24th Jan. 1900. Died of plague, 28th Jan. 1900. The second was a voluntary admission to the Maharatta Hospital, suffering from plague, but he recovered.	2 (1) Bala Genoo. (2) Chimabhai Tookaram; in- oculated, 16th Jan. 1900. Died 26th Feb. 1900 of fever. Dead body seen.	2 cases removed. 1 death, 23rd Jan. 1900.	2 3 2	This was not a very successful house.
48, Northbrook Street. Population about 60.	18 persons inoculated at various inocu- lation stations in Bombay. 27 persons inoculated, 7th Dec. 1899. 2 persons inoculated 3th Feb. 1900. Total ... 47	Nil ...	Nil ...	1 death, 7th Dec. 1899. 1 case, 6th Dec. 1899. 1 death, 7th Feb. 1900 1 death, 8th Feb. 1900	4 4 4	A very striking ex- ample of the im- munity of the inocu- lated.

	Number of persons inoculated and dates of inoculation.	Cases or deaths from Plague amongst inoculated.	Deaths from all causes, including Plague amongst inoculated.	Cases or deaths of Plague amongst uninoculated.	Deaths from all causes, including Plague amongst uninoculated.	REMARKS.
88-92, Northbrook Street Population about 150.	36 persons inoculated, 14th Nov. 1899. 15 persons inoculated, 23rd Nov. 1899. 2 persons inoculated, 1st Dec. 1899.	Nil ...	2 ... (1) Purshotam Jairam Male (Sutar), 36 years old, in- oculated, 23rd Nov. 1899. Died of abscess of liver in 33, 1st Pathan Street, 16th April 1900. Dead body seen. (2) Bhagwan Giga, aged 45, inocu- lated 14th Nov. 1899. Died 30th Jan. 1900. Taken as con- sumption.	1 plague death, 2nd April 1900.	3	
	Total ... 53		2		3	
157, Falkland Road. Population about 75.	16 persons inoculated 19 Do. do. 2nd Jan. 1900. 21 persons inoculated, 3rd March 1900. 12 persons inoculated, 31st March 1900.	Nil ...	Nil ...	1 death, 6th March 1900. There were also 3 voluntary admis- sions into hospital, all of whom died.	.....
	Total ... 68			4		
124, Northbrook Street. Population about 70 or 80.	10 persons inoculated, by Dr. Bhatwadekar. 11 persons inoculated, 21st Jan. 1900. 9 persons inoculated, 17 persons inoculated, 15th Feb. 1900.	Nil ...	Nil ...	1 death, 19th Jan. 1900. 1 death. 1 suffering. 1 death, 14th Feb. 1900. 1 suffering, 16th Feb. 1900.	.....
	Total ... 47			5		
246, Kumbharwada. A large house, but under repair, and only about 40 or 45 tenants.	24 persons inoculated, Dec. 1899. 7 persons inoculated, 23rd Jan. 1900. 5 persons inoculated, 18th Mar. 1900.	Nil ...	Nil ...	1 case, 22nd Jan. 1900. 1 death, 19th Mar. 1900. 1 death, 21st Mar. 1900.	4	The house is still badly infected, as, since writing up this re- port, 1 fresh case has again occurred among the non- inoculated.
	Total ... 36			3	4	

In house No. 7-8, Pirkhan Lane (E. Ward, West), out of 500 people some 300 were inoculated. Among the 300 inoculated there were 2 cases of plague: among the 200 uninoculated 15 cases. In house No. 26, of about 100 inmates, some 50 were inoculated. Among these 50 there was one case of plague only: among the 50 uninoculated there were 6. The Sectional Medical Officer states that in a total population of 9,000 people, in 1st Nagpada, there were 428 cases of plague, and of these all but 8 occurred amongst the non-inoculated, while the proportion of inoculated to non-inoculated may be roughly stated as 1 to 13.

Turning to E. Ward, Wari Bunder, in Anjirwadi, inoculation was pushed with considerable success, and the greater part of the inmates, numbering in all about 1,000, were inoculated. Among the few who were not inoculated 13 cases of plague occurred: among the large number inoculated only one suspicious case. In house No. 3, Muzawar-pakhadi, containing between 20 and 30 inmates, all but two were inoculated. One was away, and the other said she could not be inoculated as she had to cook. Both of these succumbed to plague, but the inoculated people remained immune. In house No. 6, Mazagon Road, of some 500 residents, 200 were inoculated. Of the 300 uninoculated

18 were attacked, but not one of the 200 inoculated. In Hyderali chawls, out of 300 people, 100 were inoculated. Among the 100 inoculated two got plague : among the 200 uninoculated 21. In house No. 3, Albert Road, of 60 residents 35 were inoculated. Plague attacked the house with considerable virulence and 10 cases occurred. These were all among the uninoculated.

Captain Wooldridge took very great trouble about this matter ; he inspired the Sectional Medical Officers working under him, Drs. Jaykar and Pednekar, with his own spirit, and constantly reported cases where plague selected as victims the uninoculated members of families, leaving the inoculated unharmed.

The statement given below is a summary of these various reports : the details have been placed at the disposal of Mr. Haffkine. Captain Wooldridge prefaces this statement with the following remarks :—

“ I am sure of my statement as far as its accuracy goes, but I cannot say how many others of the family, who were uninoculated, were not attacked. One would also like to know how the inoculated people get on : this we can do to some extent, as the majority of families are still living in this ward, but I find that those families which suffer from plague generally leave the infected house, saying ‘ There is some devil in it,’ and wander off to another, which from a plague point of view is worse.”

The cases reported are all *bonâ fide* and have been carefully noted by the Medical Officers, and personally I am satisfied of the great advantage derived from inoculation.

Statement showing the Value of Inoculation.

No. of Families	Localities.	House No.	No. Inoculated.	No. of Plague Deaths amongst uninoculated.	REMARKS.
Localities badly infected.					
4	Chamar Lane	25	21	4	} None of the inoculated were attacked.
1	Guzri Bazar	13	5	1	
1	Parel Road	Hut.	1	1	
1	DeLisle Road	120	2	1	
Localities slightly infected.					
2	Chamar Lane	1	10	4	} None of the inoculated were attacked.
1	Chamar Lane	2	2	1	
1	Chamar Lane	22	3	1	
1	Parel Road	1	5	1	
1	Parel Road Cross Lane	11	3	1	
1	Parel Road	374	2	1	
1	DeLisle Road	4	4	1	
1	DeLisle Road	7	4	1	
1	Kalachawki Road	23	2	1	
Localities badly infected.					
14	Haines Road (Shivlal Motilal's ground)	Huts.	66	14	} None of the inoculated were attacked.
4	Haines Road	240	18	4	
4	Haines Road	17	19	4	
1	Haines Road	303	4	1	
1	Gilder Street	30-32	4	1	
4	Arthur Road	185	18	4	
2	Clerk Road	Huts.	11	2	
Localities slightly infected.					
2	Haines Road	181	12	2	} None of the inoculated were attacked.
1	Haines Road	119	12	1	
2	Soondar Lane	6 B B	7	2	
2	Clerk Road	12	13	2	
2	Sankli Camp (Bhangi's Portion)	Huts.	6	2	
	Gilder Street	Hut.	3	1	

Captain Boileau, District Officer, F. and G. Wards, gives a number of similar instances in support of the prophylactic treatment. The most striking is that of Worli Mharwada—a most plague-stricken spot in former years. During the year under report the whole place (179 people) except 4 were inoculated. None of these got plague, but of the 4 uninoculated two succumbed to the disease. Among several instances of inoculated persons who were attacked with plague but recovered, the two following are worthy of record:—

(i) Muctabai Balloo died of plague on 13th November 1899. Her husband Balloo and her son were inoculated as contacts the following day. Balloo when next seen, within 5 days after inoculation, appeared all right. On 9th December he was found to be suffering from bubonic plague (gland in the left groin). According to his own statement he seems to have been taken with the plague a fortnight after inoculation, so that when seen on the above date (9th December) he had had the plague about a week. The bubo could be distinctly felt, but the symptoms on the whole were of a mild type and he walked up to us for examination. According to his own statement congee and brandy was the main treatment adopted by him. He was all right by the 19th December.

(ii) Mr. Athaide's cook's mate—Was inoculated in December and attacked in March. On the 3rd day he got bubos on both sides of the throat, went to hospital for 5 or 6 days and got all right. He went back to work, ate a whole fowl, and got bad again the second day. Two bubos appeared in the groins, but after another week in hospital he made a complete recovery.

From the Central District it would be possible to give numerous examples of the protection afforded by inoculation, but the following extract from Captain Bolton's report will suffice:—

In the following chawls inoculations were performed on nearly every resident and plague has been conspicuous by its absence among them since. The attacks in these chawls were confined to new arrivals from the famine-stricken districts who had not been previously inoculated.

Duncan Road—439, 513, 545, 529 and 601; Kajipoora—the whole street; Bellasis Road—90, 116 and 128; Telly Mohla—102; Grant Road—177.

These chawls, with the exception of 102, Telly Mohla, contain mostly Hindus, who have all been inoculated—601. Duncan Road may be quoted as a typical case. The building, which is practically two chawls in one, was a hot-bed of plague during the last epidemic and up to November. In that month the Hindus residing in the rear portion and on the southerly end of the front side were inoculated. Not one case of plague has occurred amongst them since. A few Mahomedans of the barber community who occupy the few rooms on the northern end of the front portion of the chawl facing the road, have had seven cases of plague since January last. In my opinion these houses are veritable beds of plague, and only those guarded by inoculation can live in them without fear.

District Officers were asked to note and report all cases of plague occurring in inoculated persons that might come to their notice, and the total number of cases so reported was 204, of whom 53 recovered and 151 died. Of these cases 13 were not certainly diagnosed as plague, but

the circumstances on enquiry after death were so suspicious that they were treated as plague. Of the total number of attacks 35 occurred within ten days of inoculation and 18 after the expiry of six months.

Satisfactory means of ascertaining, beyond the possibility of doubt, whether a deceased person has or has not been inoculated, are not available in Bombay, and, when to this factor are added the ordinary difficulties of diagnosis of plague, and the inclination of the people to conceal plague, it is self-evident that the figures above quoted cannot be deemed reliable. No attempt is, therefore, made to enlarge upon or to draw deductions from them.

Inoculation Stations.

The following list of inoculation stations was published by Government for general information in November :—

List of Inoculation Stations.

Places where inoculations are performed.	Names of inoculators.	Time at which inoculations are performed.	REMARKS.
At his dispensary, Cowasji Patel Street, Fort.	Dr. R. T. Nariman	... All day.	
At his dispensary, Frere Road.	„ R. M. Kalapesi	... 7 to 10 a.m. & 4 to 7 p.m.	
At his dispensary, Hornby Road.	„ R. D. Gazdar	... All day.	
At his dispensary, Bazar Gate Street.	„ N. N. Katrak	... 7 to 10 a.m.	
Colaba Village	„ B. S. Shroff ...	... 7 to 11 a.m. and 3 to 5 p.m.	
At No. 477, Bhat Bazar (Chinch Bunder Corner).	„ D. B. Naik ...	... 8 to 11 a.m. and 5 to 6-30 p.m.	
At the District Office, Babula Tank Road.	„ D. N. Horsedealer	... 8 a.m. daily.	
At the Dongri Charitable Dispensary, opposite Her Majesty's Common Jail, Dongri.	„ Dalal ... ..	... Do.	
At C. Ward Central Office, Pydhowni.	„ A. Britto ... ..	... 3 to 5 p.m. daily, except Sundays.	
At his dispensary, New Hanuman Lane.	„ P. J. D'Souza	... Daily, morning and evening.	Sunday included.
At house No. 137, Old Hanuman Lane.	„ Purshotum Harichand.	... Daily, 10 to 12 a.m. and 5-30 to 7-30 p.m.	Do.
At house No. 285, Kalbadevi ...	„ S. S. Missir ... ..	... Do.	Do.
At his dispensary, 22, Falkland Road.	„ Ismail Jan Mahomed.	... Daily, from 5 to 6 p.m., except Sundays and Wednesdays.	Commenced inoculating from 10th October 1899.
At Mr. Wamanrao Moroba's House, Pallow Road, Chira Bazar.	„ A. G. Viegas ... ..	... Daily, 8 to 9 a.m., except Sundays.	
At the Pinjrapole Compound, Bhuleshwar.	„ Bardi ... ..	... Mondays, Wednesdays and Fridays, 7-30 to 9-30 a.m.	
At the Framji Cowasji Institute, Dhobi Talao.	„ Gimi ... ..	... Daily, 3 to 5 p.m., except Sundays.	
At his dispensary, Kalbadevi Road.	„ C. Fernandes	... Between 3 and 4 p.m., daily, except Sundays.	
At his dispensary, Kalbadevi Road.	„ Trilokekar ... ..	... Daily, from 5-30 to 7 p.m.	
	„ Sambhare ... ..	... Daily, no fixed hour.	
At the Charitable Dispensary, Kumbharwada.	„ Bhatwaadekar	... Daily, 6 to 9 a.m.	
At French Bridge Corner, Girgaum.	„ D. J. Mantri	... 8 to 10-30 a.m. and 4 to 5 p.m.	
At the Charni Road Plague Office.	„ S. V. Katak	... 2 to 6 p.m.	
At No. 14, Benbhall Lane, Girgaum.	„ N. B. Naik ... ..	... 7 to 10 a.m. and 3 to 6 p.m.	

List of Inoculation Stations—(Continued.)

Inoculation Stations.	Places where inoculations are performed.	Names of inoculators.	Time at which inoculations are performed.	REMARKS.
	At Moos Building, Grant Road...	Dr. A. D. Mody ...	4 to 5 p.m.	
	At Messrs. Anderson & Co., Chemists, near Play House.	„ A. H. Ghaswala ...	5 p.m.	
	At the Charni Road Plague Office.	„ Shantaram Vithal ...	10 to 11 a.m. and 2 to 3 p.m.	
	At the Pedder Road Plague Office.	„ K. B. Shroff...	8 to 9-30 a.m.	
	At Ardesir Dady Street, Khetwadi.	„ Cawasji Edulji Dada-chanji	8 to 10 a.m.	
	At the Charni Road Plague Office.	„ A. D. Contractor ...	7 to 8 a.m. and 3 to 4 p.m.	
	At Cowasji P. T. Road ...	„ S. B. Naik ...	5 to 6-30 p.m.	
	Wari Bunder Plague Office ...	„ Hildreth ... „ Patel ... „ Abada ...	Between 8 a.m. and 5 p.m.	
	At Khadak (Nishanpada), Dr. R. V. Patel's Dispensary.	„ R. V. Patel ...	11 a.m. to 2 p.m. and 6 to 8 p.m.	
	Ripon Road Plague Office ...	„ V. B. Jayakar ... „ K. S. Pednekar ...	9-30 to 11 a.m. and 3 to 5 p.m.	
	Grant Road Hospital, opposite Northbrook Garden.	„ M. N. Wadia ... „ N. E. Chubb ... „ D. R. Khote ...	7-30 to 10 a.m. and 3 to 5 p.m.	
	At his residence, opposite Bycul-la Station.	„ Tavarla, Sub.-D.-M. Officer.	Friday, 3 p.m.	
	At the Sub-Divisional Office, Mahim Causeway.	„ Dady-Burjor...	Any time during the day.	
	At the Custom House; Worli ...	Do.	9 to 11 a.m.	
	At Bazar Road, Mahim ...	„ D'Monte ...	1 to 3 p.m.	
	At Mr. Bhosla's House, Wadalla.	„ Pardhey ...	8 to 10 a.m.	
	At Sion Causeway ...	Do.	Any time during the day.	
	At his residence, Mori Road ...	„ Shikare ...	Any time during the day.	
	At H. H. Aga Khan's Chawl, Imamwada	„ H. Fazl Ahmed ...	8 a.m. to 10 a.m.	Tuesday and Friday.
	At Memonwada ...	Do.	3 to 5 p.m.	Tuesday and Saturday.
	At No. 22, Dharamsey Street ...	„ M. K. Moonshi ...	8 to 10 a.m.	Monday and Wednesday.
	At No. 110, Chimna Butcher Street.	Do.	Do.	Tuesday, Thursday and Saturday.
	At Tank Street ...	„ Moonji ...	Do.	Every day.
	At K. B. Abdul Razzak's Stables, Ripon Road.	„ Jayakar ...	Do.	Do.
	At Dr. Mahomedbhai's Dispensary, Doctor Street.	„ M. K. Moonshi ...	Do.	Friday and Sunday.

In addition, house-to-house work is done daily by all Sectional Medical Officers. Further information can be obtained at the various District Plague Offices.

Number of inoculations performed.

The accompanying statement shows the number of inoculations performed in Bombay from the beginning of September, when the matter was vigorously taken up, to the end of the year. It will be seen that the total number was 1,63,973. Of this number 4,540 were double and treble inoculations duly reported, and, making a liberal deduction for Kathiawari refugees and others inoculated several times in ignorance, the total number of persons protected may be taken at 1,50,000.

Of the private practitioners who gave their services gratuitously, the enormous amount of work done by Dr. Viegas is very conspicuous. After him come Dr. Adams Wylie with over 7,000 inoculations, and

then at a long interval Drs. Purshotam Harichand, Trilokekar, DeSouza, and Kalapesi. Dr. J. B. DeQuadros was in receipt of a salary and was detailed for the inoculation of the Khojas, and Dr. Twigg's services were not entirely gratuitous.

Prophylactic inoculations performed in Bombay, since 31st August 1899 up to 30th May 1900, as reported to the Municipal Commissioner by the undermentioned operators.

Part of Town and Names of Operators.						Total inoculated persons since 31st August 1899 up to 30th May 1900.	
District.	Names of Operators.					In persons newly inoculated.	In persons who were also previ- ously inoculated.
A Ward	...	District Medical Staff	...	...	...	17,106	209
	...	Dr. N. N. Katrak*	...	...	...	.....	11
	...	" Guzdar*	...	...	...	11	17
	...	" R. T. Nariman*	...	...	...	33	14
	...	" R. M. Kalapesi*	...	...	...	108	352
	...	" K. B. Master*	...	...	...	16	52
	...	" D. A. Turkhud	...	...	...	54	.....
	...	" C. H. B. Adams Wylie*	...	...	...	7,573	4
	...	" Twigg	...	...	...	7,753	.....
	...	" A. W. Tuke	...	...	...	135	.....
B Ward (North).	...	District Medical Staff	...	...	...	9,241	44
	...	Dr. E. Moses*	...	...	...	248	18
B Ward (South)...	...	District Medical Staff	...	...	...	48,164	27
	...	Dr. D. B. Naik*	...	...	...	184	12
	...	" Shivdas Permanandas*	...	...	...	287	2
	...	" H. J. Dadysheff*	...	...	...	5	2
	...	" J. B. DeQuadros*	...	...	...	1,340	1,134
C Ward	...	District Medical Staff	...	...	...	9,272	133
	...	Dr. P. J. DeSouza*	...	...	...	456	12
	...	" S. V. Kantak*	...	...	...	52	27
	...	" Purshotum Harichund*	...	...	...	766	97
	...	" S. S. Missir*	...	...	...	126	141
	...	" V. S. Trilokekar*	...	...	...	132	357
	...	" A. G. Viegas*	...	...	...	18,080	331
	...	" Ismail Jan Mahomed*	...	...	...	3	.....
	...	" Miss M. N. Khareghat*	...	...	...	11	.....
	...	" Cawasjee Pestonji*	...	...	...	13	80
	...	" K. S. Engineer*	...	...	...	6	82
	...	" C. Fernandes*	...	...	...	14	.....
	...	" R. N. Ranina*	...	...	...	21	22
D Ward	...	District Medical Staff	...	...	...	2,908	380
	...	Dr. A. D. Modi*	...	...	...	7	5
	...	" H. B. Naik*	...	...	...	56	7
	...	" S. V. Kantak*	...	...	...	4	5
	...	" K. E. Dadachanji*	...	...	...	93	.....
	...	" A. H. Ghaswala*	...	...	...	101	...
	...	" S. B. Naik*	...	...	...	78	.....
E Ward (By-culla)	...	District Medical Staff...	...	...	...	8,786	.....
	...	Dr. F. N. Bisni*	...	...	...	13	20
E Ward (Wari Bunder)	...	District Medical Staff	...	...	...	14,574	3
E Ward (West)...	...	District Medical Staff	...	...	...	10,270	699
	...	Dr. A. S. Paymaster*	...	...	...	15	77
	...	" R. T. Nariman*	...	...	...	37	.....
F & G Wards	...	District Medical Staff	...	...	...	17,736	1
	...	Laboratory Officers	...	...	...	1,093	548
Central District...	...	District Medical Staff	...	...	...	21,981	229
	...	Dr. Miss Bradley*	...	...	...	198	91
	...	" Mrs. Gurubai Karmarker*	...	...	...	116	31
Total						1,58,897	5,076

* Private Practitioners.

Total number of inoculations by classes since 31st August 1899 up to 30th May 1900.

Castes and Nationalities.						Total inoculated persons since 31st August 1899 up to 30th May 1900.
Brahmins	...	...	...	...	...	1,340
Jains	...	...	...	...	...	1,052
High Caste Hindus	...	...	...	...	...	58,594
Low Caste Hindus	...	...	...	...	...	80,269
Mussalmans	...	...	...	...	...	11,504
Parsees	...	...	...	...	...	1,689
Jews	...	...	...	...	...	625
Europeans	...	...	...	...	...	232
Eurasians	...	..	...	...	...	228
Native Christians	...	...	...	...	...	1,922
Other Nationalities	...	...	...	...	...	1,441
Unclassified	...	...	...	...	...	1
Total						1,58,897

In concluding this chapter on inoculation, it may be noted that syringes, needles and prophylatic fluid were supplied free by the Laboratory ; and syringes and needles were repaired at the Laboratory without charge. Other requisites were supplied by the Municipality. Rs. 39,131-1-0 were paid by way of compensation for discomfort and loss of wages, &c., in consequence of inoculation, to people of the poorer classes. Rs. 3,182-4-6 were paid to toutis at the rate of 6 pies per head for persons persuaded by them to come to be inoculated. Rs. 10,604-7-8 were paid to medical officers in fees at the rate of Re. 1 per 10 operations. These sums were all paid out of Municipal funds. In addition a sum of Rs. 460-6-6 was paid out of the discretionary relief fund in small sums to a few people who suffered more severely than usual from the effects of the operation.

CHAPTER V.

Camps.

The accompanying statements show—

(1) The number of contacts and evicts passed through the various camps under Municipal control.

(2) The number passed through the camps or other accommodation attached to various hospitals—public and private.

(3) The number passed through various private camps.

(4) The number permanently accommodated in camps and hutments in the North of the Island.

STATEMENT I.—Showing the number of Contacts and Evicts passed through health camps under Municipal control from 1st June 1899 to 31st May 1900.

Name of Camp.		Available accom- modation.	Last Remained.	Admitted.	Trans- ferred.	Discharg- ed.	Died.	Remain- ing.
Elphinstone Bridge	Contacts.	660	13	1,556	94	1,370	6	99
Camp	Evicts ...		376	2,531	61	2,510	17	219
Gokuldas Tejpal	Contacts.	1,455	61	4,263	25	3,836	31	432
Camp	Evicts ...		67	3,583	15	3,424	26	185
Sankli Street Camp ...	Contacts.	84	...	.....	...	.....	...	.....
	Evicts ...		124	23	...	147	...	.....
Wari Bunder Camp.	Contacts.	700	76	2,071	27	2,003	10	102
	Evicts ...		41	2,678	19	2,624	10	66
Narrielwady Camp ...	Contacts.	1,725	7	7,911	...	7,686	30	202
	Evicts ...		676	2,282	10	2,928	20	.....
Balaram Camp ...	Contacts.	1,200	5	71	4	71	1	.....
	Evicts ...		295	879	16	1,014	4	140
Pyculla Camp ...	Contacts.	2,300	...	911	9	889	13	.....
	Evicts ...		117	3,684	76	3,670	55	.....
Vithal Sayana and Victoria Bunder S.	Contacts.	790	46	1,166	17	1,073	17	105
Camp	Evicts ...		60	1,692	6	1,555	6	185
Cruickshank Road	Contacts.	450	15	920	4	888	3	40
Camp	Evicts ...		15	482	2	493	...	2
Gilder Street Camp..	Contacts.	860	2	27	...	29	...	.....
	Evicts ...		210	630	24	797	1	18
Kennedy Sea Face or Churny Road Camp	Contacts	2,140	...	2,306	42	2,236	13	15
	Evicts ...		131	2,538	20	2,634	11	4
Umerkhady Camp ...	Contacts	174	...	1,386	138	1,230	1	17
	Evicts ...		26	1,196	93	1,129	...	.....
Northbrook Garden Camp	Contacts.	205	...	2,025	27	1,932	13	53
	Evicts ...		...	944	5	909	1	29
Narielwady Mahome- dan Camp	Contacts.	250	...	1,167	...	1,103	4	.....
	Evicts ...		...	.....	...	.....	...	.....
Peru Lane Health	Contacts.	75	...	327	25	352	...	10
Camp	Evicts ...		...	83	...	83	...	.....
Grant Road Camp ..	Contacts.	150	...	.....	...	.....	...	.....
	Evicts ...		40	1,001	13	982	7	39
Chowpaty Health	Contacts.	500	...	.....	...	.....	...	.....
Camp	Evicts ...		4	1,255	21	1,227	11	.....
Total ... {	Contacts.	13,718	225	26,107	412	24,703	142	1,075
	Evicts...		2,182	25,481	381	26,226	169	887

STATEMENT II.—Showing the number of Contacts and Evicts passed through Camps or other accommodation attached to Hospitals—Public and Private—from 1st June 1899 to 31st May 1900.

Name of Hospital.		Last Re- mained.	Admitted.	Trans- ferred.	Discharg- ed.	Died.	Remaining.
Arthur Road Hospital	... {	Contacts... 15	813	5	793	...	30
		Evicts ... ..	...	...	...	...	...
Modikhana Hospital	... {	Contacts... ..	105	7	95	...	3
		Evicts ... ..	...	...	...	...	...
Maratha Plague Hospital	... {	Contacts... 20	2,113	...	2,126	...	7
		Evicts	2	...	2	...	...
Mahomadbhoy Ebrahim	or {	Contacts... ..	7	...	7	...	...
H. H. Agakhan Hospital	... {	Evicts	9	...	9	...	...
		Contacts... 26	454	4	362	4	110
Dariasthan Lohana Hospital	.. {	Evicts	26	...	26	...	...
		Contacts... 19	88	...	107	...	...
Port Trust Hospital	... {	Evicts	24	90	114	...	...
Jain Hospital, Pinjrapole	... {	Contacts... 4	99	50	50	...	3
		Evicts ... ..	...	...	...	...	...
General Mahomedan Hospital.	{	Contacts... 12	247	4	239	...	16
		Evicts	7	...	7	...	...
Thakurdwar Lohana Hospital.	{	Contacts... ..	34	1	32	1	...
		Evicts	10	...	10	...	...
Adamjee Peerbhoy Hospital...	{	Contacts... 30	76	1	101	...	4
		Evicts ... ..	...	...	...	...	...
Jullai Sunni Hospital	... {	Contacts... 5	668	6	653	5	9
		Evicts	12	...	12	...	...
Bene Israel Hospital	... {	Contacts... 22	269	...	272	...	19
		Evicts	23	1	22	...	...
Jain Hospital, Parel	... {	Contacts... 3	286	...	285	...	4
		Evicts	19	...	18	...	1
Telugu Hospital	... {	Contacts... ..	87	2	85	...	...
		Evicts ... ..	...	...	...	...	...
Sarvajani Hospital	... {	Contacts... ..	220	1	219	...	...
		Evicts ... ..	...	...	...	...	...
Bhois' Plague Hospital	... {	Contacts... ..	8	...	8	...	...
		Evicts ... ..	...	...	...	...	...
Vasunjee Trikamjee Hospital...	{	Contacts... 1	17	3	15	...	...
		Evicts ... ..	...	...	...	...	...
Hindu Fever Hospital	... {	Contacts... ..	45	...	34	...	11
		Evicts ... ..	...	...	...	...	...
Brahma Kshatriya Hospital	... {	Contacts... ..	5	...	5	...	...
		Evicts ... ..	...	...	...	...	...
Marwady Fatepura Hospital	{	Contacts... ..	1	...	1	...	...
		Evicts ... ..	...	...	...	...	...
Mahim Plague Hospital	... {	Contacts... ..	404	15	385	2	2
		Evicts	128	...	124	...	4
Narielwady Mahomedan Hos- pital	... {	Contacts... ..	16	...	16	...	...
		Evicts ... ..	...	...	...	...	...
Messrs. Greaves Cotton & Co.'s Hospital	... {	Contacts... ..	66	2	60	1	3
		Evicts	125	...	121	...	4
Cutchi Dosa Oswal Hospital	... {	Contacts... ..	9	1	8	...	...
		Evicts ... ..	...	...	...	...	...
Total...	{	Contacts... 157	6,137	102	5,958	13	221
		Evicts ... 24	451	1	465	...	9
Add—Total of Contacts and Evicts in Camps	... {	Contacts... 225	26,107	412	24,703	142	1,075
		Evicts ... 2,182	25,481	381	26,226	169	887
Grand Total...	{	Contacts... 382	32,244	514	30,661	155	1,296
		Evicts ... 2,206	25,932	382	26,691	169	896

STATEMENT III.—Showing the number of persons who passed through various Private Camps.

Name of Camp.	No. of huts.		Admitted.	Transferred.	Discharged.	Died.	Remain- ing.
Parsee Health Camp—							
Cruikshank Road	58	Evicts ...	552	1	321	...	230
Marine Lines	62	,, ...	696	1	411	...	284
Chowpaty ... ..	...	,, ...	74	...	70	...	4
Batliwala's Wadi ... ..	...	,, ...	125	...	106	...	19
Baliwala's Wadi ... ..	...	,, ...	141	...	123	...	18
Churney Road ... ..	...	,, ...	161	...	77	...	84
Modikhana	18	,, ...	161	...	148	...	13
Parel ... ..	...	,, ...	132	...	35	...	97
Total ... ..	...		2,042	2	1,291	...	749
Bhatia Segregation Camp ...	50	Evicts ...	96	...	66	...	30
Daivadnya Health Camp, No. 1...	46	,, ...	411	3	398	4	6
Christian Camp	15	,, ...	106	...	106	...	...
Dakshini Brahmin Camp ..	73	,, ...	496	12	445	1	38
Somavanshi Kshatriya Camp ...	56	,, ...	252	...	152	5	95
Gaud Saraswat Camp	58	,, ...	336	16	270	...	50
Pathare Prabho Camp, No. 1 ...	107	,, ...	676	25	315	4	332
Chaudrasenya Kayasta P. Camp	27	,, ...	180	...	87	3	90
Khatry Camp	6	,, ...	36	...	16	...	20
Daivadnya Camp, No. 2	29	,, ..	132	1	39	...	152
Pathare Prabho Bhugwant Rao Camp	52	,, ...	202	...	57	6	139
Pathare Prabho Camp No. 2 ...	30	,, ...	137	5	98	1	33
Total	509		3,120	62	2,049	24	985

Full details are not available regarding certain other Private Health Camps, viz.—

The Khoja Segregation House in Tandel Street.

The Cutchi Memon Segregation House in Frere Road.

The Tramway Company Sheds on Shival Motilal's land and elsewhere.

The Madhowji Mill's Segregation Camp on Shival Motilal's land.

468 persons passed through the Lohana Camp, Frere Road.

313 persons passed through the Bannya Mahajanvadi used as a Segregation House.

120 persons passed through the Petit Mills' Health Camp.

STATEMENT IV.—Showing the number of people more or less permanently accommodated in camps and hutments in the North of the Island.

No.	Name of Camp.	No. of occupants.
1	Vincent Road (West side)	6,357
2	" " (East side)	3,459
3	" " Bhoiwada and Naigaon (Municipal Camp)... ..	2,365
4	Sion Agriwada, Koliwada and Bhundarwada	2,839
	" near Station	350
5	{ Rawli Hill	3,862
	{ Vadala	
	{ Gowari	
	{ Bodun Tank Road	
	Sewri Koliwada	5,289
6	{ " Cross Road and Agriwada... ..	
	{ " New Road... ..	
	{ Parel Tank Road	
	Chota Sewri	
7	Elphinstone Health Camp (Municipal)	623
8	Dadar Road and Camps	6,130
9	Dadar Kumbharwada (Municipal Camp)	2,297
10	Matunga	3,997
11	Mahim	603
12	" Causeway	403
13	" Hospital Camp (Municipal)	4,338
14	Dharavi Fields	700
15	Sayad's Huts	132
16	Worli Koliwada	2,163
17	" Pacady Fields	1,062
18	Parbhadevi Bhatia Camp... ..	307
19	Pumping Station Evicts and Marwada	303
20	Fergusson Road, Currey Road and Aba Tahas' Chawl	180
Total ...		47,939

These tables show that roughly about 1,10,000 people passed through the various camps during the year under report, the corresponding figure last year was about 95,000.

The total number of persons passed through the camps, &c., referred to in Statements I and II should correspond with the total of columns 7 and 10 of the Statement on page 40 showing the total number of contacts and evicts sent to camp.

As a matter of fact the total number of contacts admitted into camps is actually larger by some 4,000 than the total number reported by District Officers to have been sent to camp ; and this can only be explained by members of families who happened to be away at the time of eviction subsequently joining their relations in camp.

The number of evicts shown as admitted into camps is smaller by some 11,000 than the number reported to have been sent to camp. The discrepancy is explained in part by leakage and in part by the fact that some of the evicts turned out by District Officers preferred to go to the private camps, &c., referred to in Tables III and IV.

Table I above gives the names of the various public camps and the accommodation available at each.

These camps were constructed with bamboo posts, roofs either of double bamboo matting or cadjans, and walls of bamboo matting. The roofs of some of the sheds in the Elphinstone Bridge, the Goculdass Tejpal, and the Northbrook Gardens camps were of corrugated iron—a more substantial protection against wet weather. The floors were of earth or moorum. Latrine accommodation was provided and stand-pipes with paved platforms for bathing and washing were erected: drainage and cesspool arrangements were made where necessary. The camps were lighted throughout with kerosine oil, on old wooden lamp-posts. Alterations, additions and repairs were constantly going on in the various camps as necessity arose. At the beginning of the monsoon those on low-lying ground were completely demolished, to be erected again in the cold season, while of the remainder a sufficient proportion was strengthened and made weather-proof to meet the requirements of the monsoon.

The camps were practically the same and in the same situations as the previous year. The Arthur Road Dhobi Camp was amalgamated with the Arthur Road Hospital, the Crawford Market Camp was made over to the Executive Engineer for the accommodation of persons evicted from condemned houses, and it was not found necessary to re-erect the Ghorupdeo Camps. The Plague Administration continue to be indebted to Sir Dinshaw Maneckji Petit for the loan of the site of the temporary wards and sheds at the Maratha Hospital, to Rao Bahadur Ellapa Balaram for his maintenance of the Balaram Camp, to the Colaba Land and Mills Company for the loan of the site of a small camp at Victoria Bundar, now amalgamated with the Vittal Sayana Camp, and to various gentlemen for the free use of their property in F and G wards and elsewhere during the year. Government land was occupied rent free, the Port Trust continued to charge $\frac{3}{16}$ th of the ordinary rates for land let out to the Municipality for plague purposes, and the Improvement Trust charged out of pocket expenses, or such rent as they would otherwise have secured.

The camps were managed on precisely the same lines as described in last year's report, and it will suffice to transcribe the following account of the Narielwadi Segregation Camp, given by Mr. Row, the Camp Master :—

Segregation Camp.—Established 1897; accommodation for 1,000 persons, *i.e.*, 500 for contacts and 500 for evicts. The camp was for Mahrattas and low caste Hindus; contacts and evicts came here generally from E Ward West, F and G Wards, and Nos. 8 and 9 Districts; on the arrival of contacts and evicts in the camp, their names were at once registered and they were then taken to the sterilizer with all their clothing and furniture and after being washed and their belongings disinfected they were allotted huts; contacts on one side of the camp and evicts on the other to prevent the possibility of the latter being infected by the former. Every inmate of the camp is daily inspected by the Medical Officer of the section; blankets are also served out to those in poor circumstances, and to any others who may require them. In cases where the contacts and evicts were badly off they were allowed to retain the blankets and take them away with them when leaving camp. The blankets that were returned were

disinfected before storing away in the godown. Cots are also supplied to those suffering from indifferent health. The inmates must sleep in camp at nights. A roll-call is held daily by the Camp Master to see that all return to camp. During the day they are allowed to come into and leave the camp as often as they like and with absolute freedom. In case of plague in the camp the patient is at once removed to hospital, the contacts follow after getting their good clothing, &c., thoroughly disinfected. The hut is then swept and the rags, &c., burnt at once, and the hut itself is thoroughly disinfected for 3 or 4 days and left unoccupied for 10 days.

Women who are brought to camp having lost their bread-winners by Plague, and others who are unable to go to work always receive compensation from the Relief Fund established for the purpose. As a rule they are detained 10 days in camp, but if the camp is full and pressed for room, they are allowed to leave before the ten days elapse, but not before the rooms from where they have been evacuated have been thoroughly disinfected.

If the house or chawl from where they came are under repairs and not ready within 10 days, then they are allowed to stay in camp until such time as their quarters are fit to be re-occupied.

I need hardly say that the contacts and evicts greatly appreciated the camp and often begged to be allowed to stay on and even suggested paying rent if allowed to do so; they never forgot to express their gratitude, in the shape of a "burrah salaam," when leaving camp. Their out-going and in-coming cartage was always paid.

Disinfection Work at the Sterilizer.—On arrival in camp the contacts and evicts are at once taken into the disinfecting camp with all their clothing, boxes, furniture, &c. The clothing is placed in the sterilizer and disinfected.

While the above process is on, the boxes and furniture are well washed in a strong solution of phenyle, the contacts and evicts in the interim are having a bath with strong carbolic soap, the clothing on their person is now taken to the sterilizer and thoroughly disinfected as above according to regulations. Great care is taken to avoid the infected clothing coming in contact with the disinfected clothing.

All contacts and evicts on their way to the Mahratha Hospital have their clothing, &c., sterilized here, and all clothing from contacts and evicts who are admitted into the Wari Bunder Camp have the clothing sterilized here.

When Plague is in full force the sterilizer is kept working the whole day continually. Having a sterilizer in the camp greatly facilitated the work of disinfection. A thermometer is always placed in the middle of the clothing which should not register less than 212° Fah.

The following brief report from Dr. P. J. deSouza, the Medical Officer of the Goculdas Tejpal and Charney Road Camps, is also of interest :—

Health Camps have this year also been an interesting and useful feature in the plague operations.

In my report, last year (*vide* Report of the Municipal Commissioner on plague in Bombay for the year ending 31st May 1899, page 76), I endeavoured to make clear the arrangement and the system observed in these camps, and also enumerated the number of camps then existing under my charge as Medical Officer and the accommodation each contained. This year it was not found necessary to have a camp at the Crawford Market, but the Charney Road and Goculdas Tejpal Camps were again requisitioned. One or two slight changes were made in the rules in force last

time. This year new admissions were not sent at once to the huts which they were to occupy while in camp, but were first set apart in a block specially reserved for all new comers. Here their persons, clothes and belongings were disinfected with all possible care, after which they were allowed to take possession of the huts assigned to them in the camp. This ensured personal cleanliness and minimized the risk of infection in the camp itself. Then again, last year, persons who stayed in camp over 10 days were liable to pay a small charge for rent, but this time this was done away with and people were allowed to stay rent free for so long as their houses continued unfit for habitation, after which they were obliged to leave.

The management of the camps which I had to inspect gave me every satisfaction. They were well kept and tidy and the strictest cleanliness prevailed. The Camp Masters did their duties carefully and regularly. Latterly I was for a very short time placed in medical charge of the P. W. D. Secretariat Camp. Here there was much room for improvement in point of cleanliness, and unfortunately there was no responsible person in charge of it who could look after things generally and prevent plague or suspicious cases from coming in.

I had also to inspect the Daiwadnya Private Camp medically. Everything was in good order and there was no case of plague throughout.

In conclusion it seems to me to be now established beyond doubt that these Health Camps are one of our best weapons for fighting the plague. Well situated in open localities, kept up with scrupulous care and cleanliness, they have a decidedly beneficial effect on the health of their occupants. A glance at the foregoing tables will show that the percentage of disease and deaths in these camps was very insignificant in view of the fact that the large number of daily admissions came straight not only from highly infected localities, but from houses and rooms in which plague had actually occurred within a day or two of their arrival in camp.

The origin of organised private camps was described in last year's report. The communities which started private camps during the year under report were for the most part the same, and the private camps along the Kennedy Sea Face and in A Ward were as before placed under the supervision of a Special Inspector with a staff of scavengers, halalkhores, &c.

The Pathare Prabhu Health Camp was as before the best managed and an extract from the report of the Honorary Secretary, Rao Bahadur Dhakji Kashinath, to whom every credit is due, is given below:—

As last year, with the permission of the Municipality, Camp No. 1 was erected, on the Kennedy Sea Face, near the Marine Lines, and Camp No. 2 near the Hindu Gymkhana.

The Municipality, as last year, provided latrines, washing places, water-taps, tubs for cook-room waste water, and lights; providing also conservancy establishment and police ramosis. This year two large iron tanks were supplied for storage of water as there was no sufficient pressure to deliver the requisite quantity from the existing main pipe there.

In addition to the Municipal arrangements, we erected this year at our cost several urinals of a pattern most suitable to our people. This practically stopped the nuisance outside the urinals and all about the compound walls of the camps.

Masonry sinks were provided to each compartment for receiving and carrying waste water from the cook-rooms to the tubs. Two coolies were maintained by us to look after the conservancy of the camps in addition to the Municipal establishment, as it was considered essential to keep the camps scrupulously clean.

Finance.

The cost of erecting and maintaining the Health Camps is met from contributions received from the members of the community.

Sheds.

The sheds constructed were of bamboos, cadjans and bamboo matting. The floors were of earth. In all 159 rooms were constructed. A complete ground plan will be submitted hereafter. A few separate huts were provided at both the camps for segregating suspicious plague and small-pox cases.

Fire.

The necessary arrangements for protection against fire were made. Tubs were placed all over the camps full of water at all times, so also galvanized iron buckets filled with sand. Ladders and iron hooks with bamboo poles were also provided and the danger from fire was thus minimised.

The regulations against the use of naked lamps were strictly enforced and luckily no fire occurred.

Recreation.

In Camps Nos. 1 and 2 small open spaces were reserved for recreation purposes.

Admission of Families to the Camps.

Families certified by any of the medical gentlemen on the sub-committee as being in immediate need of camping out and free from infection, were admitted to the camps for a fortnight. Families which could not make provision for themselves elsewhere after a fortnight's stay in the camps and were unable to pay for their sheds the nominal contribution fixed by the sub-committee were allowed to remain free, whenever it was found unsafe to allow them to return to their houses. Families paying the fixed contributions were allowed to stay at the camps for the season.

No contacts were admitted to the camps. They were provided with accommodation at the contact shed at the Pathare Prabhu Fever Hospital and transferred to the Health Camps when the medical authorities considered it safe to do so.

Rules.

Printed copies of the rules were distributed amongst the residents and also posted up at conspicuous places in the camps. These rules and also those issued from time to time were strictly observed by the residents.

Medical Inspection.

A system of medical inspection of all the residents of the camps was undertaken this time also by the medical gentlemen on the sub-committee, viz.—

Dr. Govindrao Bhau Prabhakar.

Dr. Atmaram Vasudeo Velkar.

Dr. Venayekrao Sokerji Trilokekar.

Dr. Shamrao B. Nayak.

Dr. Anandrao P. Kothare.

The daily inspection book was kept open on a table at the Camp Office for general information. Every case of plague or any other case of a serious nature was promptly reported to the authorities. These medical gentlemen, notwithstanding the heavy calls upon them in connection with their varied professional duties, continued to do their voluntary work most cheerfully and thoroughly.

As required by the plague authorities weekly reports were submitted to the District Plague Officer for submission to the Deputy Commissioner, Plague Operations, giving the total available accommodation, the number of inmates at the

commencement of the week, the number of new admissions, the number of transfers, the number who left, the number of deaths, the number remaining and the names of the patients and the diseases they were suffering from.

Control and Management.

The general control was exercised by the Sub-Committee formed as under :—

Chairman.

Mr. Nanu Narayan Kothare, J.P.

Members.

Dr. Atmaram Vasudeo Velkar.

Dr. A. P. Kothare.

Mr. Anandrao Harishankar (Treasurer).

Mr. Atmaram Juggannath Kirtikar, J.P.

Rao Bahadur Dhakji Kashinath, J.P. (Honorary Secretary).

Dr. Govindrao B. Prabhakar, J.P.

Dr. S. B. Nayak.

Dr. Venayak S. Trilokekar.

Mr. Venayakrao Meghasham.

The Honorary Secretary Rao Bahadur Dhakji Kashinathji had the general charge of the Camps and the Honorary Managers, named in the margin, assisted him. The voluntary work performed by these assistants was praiseworthy. The number of families accommodated in Camps Nos. 1 and 2 was 110 consisting of 818 persons. The first family came to the Camps on 3rd December 1899 and the last family left the Camps on 1st June 1900. So that the Camps were utilized for six months.

Mr. Anandrao Juggannath Desai.
Mr. Sokerji N. Navalkar.
Mr. Luxumoa Venayak Jeyakar.

Of the 110 families accommodated at the Camps 73 were accommodated free of charge. Thus showing that these 73 families would have remained in their affected houses and suffered from plague, had the camps not provided accommodation for them. There were six deaths from causes other than plague and two births in the Camps. There were three suspicious or plague cases which were promptly removed to the Fever Hospital. Their huts were unroofed, disinfected, and kept unoccupied for over 10 days. The three cases were as under :—

1. Mr. Anandrao Bhau, from Kumbhartookda, arrived at the Camp on 6th December 1899 and was removed to the Hospital on 31st idem, so he was attacked 26 days after arrival.

2. Mankubai, from Sonapore Lane, arrived at the Camp on 31st December 1899 and was removed to the Hospital on 4th March 1900, so she was attacked 64 days after arrival.

3. Miss Gulbai, from Dukergully, arrived at the Camp on 24th February 1900 and was removed to the Hospital on 8th March 1900, so she was attacked 13 days after arrival.

It is impossible to say exactly where the first two persons caught the infection. But since these families were in the habit of frequenting their houses for washing, clothing, &c., owing to the scarcity of water at the Health Camps, it is just possible that they brought the infection from their affected houses. Thanks to Mr. J. H. DuBoulay, I.C.S., Deputy Commissioner, Plague Operations, two iron tanks for the storage of water were provided and thus considerably removed the serious inconvenience felt by the want of adequate supply of water. The third case hardly requires any explanation.

It will be seen from the number of persons accommodated in the Camps and the very small number of deaths that occurred, that there was hardly any sickness at the Camps. The percentage of deaths being only '73 and of plague attacks '36. It was noticeable that the general health of the inmates was very good, notwithstanding that they had to endure certain discomforts inseparable from sudden change from their regular residences into the temporary Camps. It has been recognized that the discovery of plague cases is the basis of all plague administration. The measures adopted by us were so effective that no case of death from plague occurred in our Camps.

I have very great pleasure to subjoin a copy of the remarks made in the visitor's book by the District Plague Officer, District No. 5, which are appreciating and encouraging.

"I visited the Pathare Parbhu Health Camp and was shewn all over it by its energetic and able Manager Rao Bahadur Dhakji Kashinath, J.P. It was deservedly considered to be a model camp last year and it certainly has not in way deteriorated since then. Rao Bahadur Dhakji Kashinath and the gentlemen of his community who have devoted so much of their time and money to the comfort and well being of their co-religionists, may be heartily congratulated on the success that has attended their efforts. The knowledge that their labours and self-sacrifice have resulted in rescuing many of their caste-men from the danger of infection and a deadly disease, must be very gratifying to them and I feel sure they have earned the gratitude of the whole of their community—nothing could be more perfect than the arrangements that have been made for the accommodation of the inmates of the Camp on a sound and sanitary basis. The Camp is a model of neatness and cleanliness. Rules have been framed and are posted up at conspicuous places in the Camp, particular attention being paid to the sanitary condition of the occupants and the Camp itself and its vicinity. I was much struck with the measure taken for the prevention of fire, the danger of which has been reduced to a minimum. The Camp is visited daily by medical inspecting officers who belong to the community and have offered their services gratuitously. Everything I saw afforded proof of systematic management and forethought on the part of the gentlemen who have undertaken to erect and maintain this admirable Health Camp."

Honorary Secretary and General Manager.

Rao Bahadur Dhakji Kashinath, J.P.

Assistant Honorary Managers.

Mr. Juggannath Anandrao Desai.

Mr. S. N. Navalkar.

Mr. Luxumon Venayekrao Jeyakar.

The whole under the general control of a Sub-Committee of which Nanu Narayan Kothare, Esq., is Chairman.

Medical Inspecting Officers.

Dr. G. B. Prabhakar.

Dr. A. V. Velkar.

Dr. V. S. Trilokakar.

Dr. S. B. Nayak.

Dr. A. P. Kothare.

W. A. CUPPAGE, CAPT.,

Dist. Plague Officer, C Ward.

20th April 1900.

The following is the report of the Special Inspector regarding the other private camps under his charge. It was his duty to attend to the cleanliness of the camps, and the various committees were held responsible that every case of sickness was promptly reported to him; beyond this their internal arrangements were not interfered with:—

Bhattya Segregation Private Health Camp, Cruickshank Road.

This is a permanent camp erected in beginning of 1899, behind the Gokuldas Tejpal Hospital. It is managed by a Committee of the Bhattya community from the Mahajan Funds. Mr. Khimjee Jairam Narainjee being the Secretary, and the Manager, Rao Saheb Hurjiwan Soonderdass. The camp was opened on the 20th November 1899 and has accommodation for about 150 persons, but the maximum who took advantage of it this year was only 42. It is watched by a Pardesi watchman and is still occupied. The lighting as well as the pay of the Ramosee are borne by the community, but the halalkore and water service by the Municipality.

Gaud Saraswat Brahmin Private Health Camp, Marine Lines.

This camp, opened on the 19th December 1899, consisted of 2 lines of huts running from east to west, situated to the south of the Pathare Prabhu No. 1 Camp. There were 58 tenements to accommodate about 300 persons, but the actual number in occupation was 320. The Committee of Management was presided over by Rao Bahadur Ganeshyam Nilkant Nadkarni J.P., the Secretary being Mr. Nilkantrao Balkrishna Parulkar. A certain number of huts were erected solely at the expense of some of the tenants, whilst the majority were raised by subscriptions and allotted to the poorer classes. The camp registered 2 plague cases, one a boy, aged 12, was removed to the Modykhana Hospital on the 6th January and died on the 9th. He was attacked the day after his arrival in camp from a house in Moogbhat where there was rat mortality. The 2nd case was that of a man aged 28 removed to the Hindoo Fever Hospital on the 17th February and died on the 20th, also an imported case. Seven privy seats, six lanterns, and five water taps, as also one halalkore and one cooly were provided at Municipal expense.

Somavavshee Kshasthya Private Health Camp, Marine Lines.

The camp consisted of 56 tenements to accommodate about 280 persons, the maximum number in occupation being 229. President, Committee of Management, Mr. Janardhan Kashinath Manthri, J.P., the Secretary, Dr. Daroba Janardhan Manthri, J.P., and the Camp Manager, Mr. T. R. Jukar. An improvement in the construction of the huts next year is necessary; the verandah eaves should be raised about 18 inches to admit of light and ventilation, particularly in the back row of huts which were constructed too close to the fencing of the Dakshni Brahmin Camp. There were two suspicious deaths in this camp, one on the 4th of February and the other on the 3rd of March, in both cases, the deceased persons were not under any medical treatment. There were 4 deaths from ordinary causes. Five privy seats and five water taps as well as a cooly for sweeping and cleaning the refuse were provided by the Municipality. The halalkore of the Gaud Brahmin Camp also attended the privies of this camp and one Police Ramosee patrolled both camps at night only. Seven lanterns were provided for lighting the camp.

Dakshni Brahmin Private Health Camp, Marine Lines.

This camp was opened on the 24th of December 1899. It consisted of 73 tenements available for 360 persons, but the number accommodated was 359. Some of the huts were solely erected at the expense of the tenants, while the majority were erected from funds collected by the Committee of Management, Rao Bahadur Narayen Trimbak Vaidya, being the President, and Mr. Waman Bhicajee Gokhale, the Secretary. Four separate rooms, about 10 feet square each, were put up for the use of plague contacts. On the 21st of January a case of plague was removed to the Hindoo Fever Hospital. On the 14th of February there was a suspicious death, the patient was treated by a medical practitioner for influenza when it was actually a plague case; the man was ill for 2 days and had a bubo, which the doctor failed to detect. On the 13th of May there was another suspicious death in the camp, the deceased, a non-resident, occasionally slept in the verandah of one of the huts; his

actual residence was in his shop on Kalkadevi Road, at that time an infected locality. He was seen by a native doctor twice the day before his death who failed to detect plague symptoms, the man was ill with fever for two days. Ten water taps were provided, the piping, &c., of two of these were laid at the expense of Mr. Vaidya, and there were also 12 privy seats; one of these was constructed at the expense of one of the tenants. Over 500 feet of an open channel drain was constructed at the expense of the community on raised earthwork to carry off the dirty water from seven nahanis on the northern and southern boundary of the camp. Ten lanterns were provided as well as the services of one halalkore and one cooly for attending the privies and keeping the camp clean. One Police Ramosee was appointed to patrol the camp at night only.

**Chendrasenya
Kayasta Pra-
bhoo Private
Health Camp,
North of Hin-
doo Gymkhana.**

This camp consisted of 27 tenements available for 150 persons, but the maximum number accommodated was 176. It was opened on the 27th of December. There were three deaths from ordinary causes. Six privy seats, six lanterns and four taps and the services of one cooly and one halalkore were provided for keeping the premises clean at Municipal expense. Mr. M. N. Samarth was the Secretary, and Mr. Vinayek Rao, the Camp Manager, to whom it was arranged that all tenants had to report daily in writing any cases of illness in their huts.

**Kathri Pri-
vate Health
Camp, North of
Hindoo Gym-
khana.**

This camp was situated to the north of the previous camp. The whole of the space allotted to the community was not taken up. Three huts only were erected, consisting of six tenements to accommodate about 36 persons. The huts were put up at the expense of the tenants themselves. The staff who attended the previous camp, attended this camp also. Three privy seats, and three water taps were provided for the occupants. The Secretary of the Committee of Management is Mr. Bapujee Morojee.

**Daiwadnya
Private Health
Camp, North of
Hindoo Gym-
khana.**

This camp was opened on the 5th of January 1900, and consisted of 29 tenements available for 150 persons, but the maximum number accommodated was 187. Rao Bahadur Bhasker Rao Pitale being the President of the Committee of Management, the Secretary Mr. Vasant Rao Nana and Mr. Ganpat Rao, the Camp Manager who constructed a hut to live in at his personal expense and the remainder of the huts were erected from funds collected amongst the community. Five privy seats, three lanterns, six water taps and the services of one cooly were provided for cleaning the camp and clearing the refuse and removing the sullage water at Municipal expense. On the 21st February one case of plague was removed to the Hindoo Fever Hospital. No private doctor inspected this camp, but arrangements were made for Doctor deSouza, who was attached to C Ward District Staff, to examine the camp once a day. Two Police Ramosees patrolled the camp in addition to the two previously mentioned camps and one halalkore attended to the privies of all three camps.

**Fathare Pra-
bhoo "Bhag-
wantrao's"
Private Health
Camp, North
of Hindoo
Gymkhana.**

The camp was opened on the 24th of December 1899 and consisted of 32 tenements with detached cook-rooms available for 175 persons, but the maximum number accommodated was 189. The President of the Committee of Management was Mr. Bhagwantrao under whose name the camp was designated. All the space allotted to the community was taken up. All these people resided in Pathare Prabho camps, Nos. I and II last year, but owing to some disagreement with their Secretary, they decided to have a camp of their own. There were six deaths from ordinary causes, and two plague cases, one on the 3rd February, a boy aged 13, who was removed to hospital and recovered (the same lad was attacked last year and recovered), the next case occurred the 25th March, a woman, aged 45, was attacked with fever on the 25th and developed plague symptoms on the 29th and died in hospital on the 30th. Dr. Trilokekar medically inspected the camp daily. Five privy seats, eight water taps and five lanterns were provided, besides the services of one cooly for cleaning the camp and removing the sullage water. Two Police Ramosees patrolled the camp, in addition to the Pathare Prabho No. II, one during the day and the other at night, and one halalkore attended the privies of both of these camps.

Christian Private Health Camp, Cruickshank Road.

This camp was opened on the 21st of January and consisted of 15 tenements with accommodation available for about 100 persons, but the maximum number was 96. There was still room enough for three or four huts, but as they were erected at the personal expense of the tenants, none came forward. Dr. F. X. Ferreira and Mr. J. Godinho were the Secretaries representing the community. Three water taps and ten privies were provided, also 6 lanterns, besides the services of one cooly and one Halalkore for keeping the camp clean.

Dalwadia Private Health Camp, Cruickshank Road.

This camp was opened on the 1st January and consisted of 55 tenements available for about 350 persons, but the maximum in occupation was 394. There was still room enough for 8 or 10 tenements. Six water taps and eleven privies were provided, besides the services of one halalkore and one cooly for keeping the camp clean. A large number of the huts were allotted to the poorer classes of the community who could not afford to subscribe. Mr. Ganpat Rao Nana Shete, the Honorary Joint Secretary, and Rao Bahadur V. J. Shunkersett lived in tents on the premises. There were three deaths from ordinary causes, and one case of plague removed to the Hindoo Fever Hospital on 9th February, a boy, aged 16, who handled some dead rats at his house on his way home from school. Two Police Ramosces watched the camp, one during the day and one at night. Eight lanterns were provided for lighting the camp.

Parsee Private Health Camp, Cruickshank Road.

This camp was opened on the 1st of January and consisted of 58 tents with detached cook-rooms and bath-rooms available for about 400 persons, but the maximum accommodated was 405. The privy accommodation, water taps, and lanterns for lighting the camp were provided at the expense of the Parsee Punchayet, of which Mr. Jiwanjee Jamsetjee Mody is the Secretary. Applications were made to this gentleman for tents, a certain number of which were allowed to the poor classes free of charge, the well-to-do folk had to pay a nominal rent of four rupees per tent per month. There were only two plague cases in the camp which occurred within a day or two of their arrival from infected quarters. Two coolies for keeping the camp clean and one halalkore were provided at Municipal expense. The camp was medically inspected daily by Dr. Dadysett.

Parsee Private Health Camp, Marine Lines.

This camp was opened on the 7th of January and was intended for the portion of the community residing in Charniwady, Dhobi Talao, &c. It consisted of 26 tents and 36 cadjan tenements with detached cook-rooms and bath-rooms. The available accommodation was 450, but the maximum actually accommodated was 481. There were two plague cases removed to the Parsee Fever Hospital, one on the 2nd of March and the other on the 7th of April, both imported. One death from plague occurred in a tent on the 22nd of April, an imported case from Charniwady. The allotments for tents, &c., were made similar to the Cruickshank Road Camp, the Punchayet bearing the expense of lighting, water taps and privy accommodation. Dr. Gimi, S. M. O., in Dhobi Talao C Ward, medically inspected the camp. Three coolies and one halalkore were provided at Municipal expense.

Mody Khana Private Health Camp.

This camp was attached to the Parsee Auxiliary Fever Hospital at Mody Bay, the maximum number accommodated was 107 in 18 tenements. All expenses for lighting, privies, water taps, and the wages of one cooly for keeping the camp clean were borne by the Punchayet. Halalkore service alone was rendered by the Municipality.

In addition to the staff enumerated in each of the abovementioned camps, there were two additional halalkores, one stationed at Marine Lines and the other at the camps north of the Hindoo Gymkhana, to assist the camp halalkores for a short time only to remove the privy water from the cess-pools. A night-soil cart also attended the camps north of the Hindoo Gymkhana for the same purpose twice daily.

The services of a Sub-Inspector were entertained for keeping the muster of all the staff in the private camps situated on the Kennedy Sea Face and Cruickshank Road.

The following statement shows the number of plague cases that occurred among the contacts and evicts in the camps mentioned—classified according to the interval between arrival in camp and attack.

How many days after admission.	Vittal Sayana.		Elphinstone Bridge.		Charni Road.		Gokuldas Tejpal.		Grant Road.		Chowpatti.		Balaram Camp.		Gilder Street.		Nareelwadi.		Wari Bunder.		Byculla.		Northbrook Gardens.		Babula Tank.		Piru Lane.		Total.	
	C.	E.	C.	E.	C.	E.	C.	E.	C.	E.	C.	E.	C.	E.	C.	E.	C.	E.	C.	E.	C.	E.	C.	E.	C.	E.	C.	E.	C.	E.
Same day	1	...	2	1	1	1	2	...	6	2
1 "	3	1	1	2	4	4	3	...	1	...	4	1	...	2	3	2	4	5	3	...	2	1	28	21
2 days	5	1	1	2	1	...	3	3	1	5	10	4	2	1	1	1	25	16
3 "	1	1	...	3	5	...	2	1	6	2	3	2	...	3	2	1	1	4	...	1	1	...	1	22	18
4 "	1	1	1	1	4	3	4	2	1	...	1	5	...	...	...	...	...	...	1	2	1	2	...	2	...	...	...	16	18
5 "	...	...	2	...	1	2	3	...	2	...	...	...	...	...	...	...	...	...	4	...	1	2	...	1	...	...	...	13	5
6 "	...	1	...	...	2	...	1	2	...	...	...	...	...	...	...	2	...	...	...	1	...	...	1	...	1	...	...	5	6
7 "	...	...	...	...	3	2	2	2	...	...	...	2	...	...	...	...	1	1	2	...	...	...	1	...	...	1	...	9	8
8 "	...	...	...	...	1	1	1	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	2
9 "	...	...	...	...	...	2	1	...	1	...	...	...	...	...	...	...	1	...	2	...	...	2	1	...	...	...	...	7	5
10 "	1	...	2	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	2	1	...	...	...	...	...	...	...	7	1
11 to 20 days	4	1	...	1	3	1	4	3	1	...	...	3	1	2	...	...	...	...	...	...	1	...	1	...	1	1	...	16	12
Over 20 "	2	4	...	2	7	...	3	4	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	13	10
Total	18	11	10	11	33	16	27	17	14	2	8	19	1	7	...	5	13	8	14	18	4	9	8	2	7	3	...	169	124	

Note.—There were no cases in the Cruickshank Camp.

It is interesting to note that out of 293 cases of plague among the occupants of the Municipal camps under the control of the District Officers, 190, or about 65 per cent., occurred within the first five days after admission. The camps in question are those detailed in Table I.

Dr. P. J. de Souza, who, as in the previous year, was placed in medical charge of the Goculdas Tejpal and Charni Road Camps, and did his work with the utmost zeal and thoroughness, writes :—

“ I would not venture to say that in the cases of plague in which the interval between admission to camp and attack is long, the victims did *not* get the infection in camp, but I would point out that a very large number of the camp people, and almost all of the persons mentioned in my reports spend the greater portion of the day outside, going about the town, generally in much infected quarters ; and such as are attacked mostly take ill before coming back into the camp. In view of these facts the probabilities seem to be in favour of the view that these people catch the infection outside the camp.”

Camps in the
North of the
Island.

The camps in the North of the Island, referred to in Table IV., were under the control of the District Officer, F and G Wards. They constituted a heavy additional burden, but Captain Boileau managed them most efficiently. In most cases private individuals joined together and made their own arrangements for securing sites and erecting huts, but it will be seen that four of the camps were erected by the Municipality for the benefit of people who were too poor to do this themselves. The land along the Vincent Road belongs to the Improvement Trust, and was temporarily made over by that body to the Municipality for the allocation of sites to individuals, &c., who could not provide for themselves elsewhere. This duty was discharged by the Executive Engineer, who allotted sites to the Parsee Panchayet, *The Times of India*, the Gas Company and Messrs. Thomas Cooke & Sons for their employes, as well as to some 44 individual applicants. The following remarks are extracted from Captain Boileau's report on these camps. It should be mentioned that during the year large numbers of rat burrows were noticed in the fields where these camps were situated. And one collection of huts became thoroughly infected with plague and had to be closed and demolished.

There were 47,939 people encamped in F and G Wards during the epidemic 1899-1900 and applications, consequent on an advertisement in the *Times of India*, *Samachar* and *Jam-e-Jamsheer*, to the effect that people were to ask permission for the erection of camps in the fields and to apply for water, began to be received as early as 12th December 1899, and from thence on applications for stand-pipes and latrines were numerous.

168 stand-pipes and 69 latrines were erected for the use of the people, and these latter were as nearly as possible placed so that different camps had their own latrines. Those huts built on Municipal ground were allowed their private latrines and many people also applied for and received private taps. Stand-pipes were erected wherever the District Officer thought necessary. A certain amount of trouble was caused by the mains leading to the camps not being sufficiently large, the consequence being that many camps received only a very small supply and some a mere dribble. This could be easily rectified, should occasion occur, by

having larger mains, but it was only in Matoonga, in the camps between the G. I. P. and B. B. & C. I. Ry., where this want was really very much felt. The remaining camps had ample water. The B. B. & C. I. Railway authorities were most accommodating in allowing me to drain surplus water from the Matoonga camp to their borrow pits, thus enabling me to overcome what at first appeared to me to be a serious difficulty as the land round the camps is quite flat. The halalkore service was most ably carried out by Dr. Sorab Hormusjee, District Health Officer, No. 4 Division, and his staff. Their work left very little to be desired.

The attitude of the people was throughout the whole camps most friendly, and only in one or two instances did people make themselves at all objectionable. No trouble was experienced in the disinfection of huts, but there was no doubt a certain amount of concealment of sickness, though people for the most part preferred to give information.

The camps extended from Dadar Road and Naigaon Cross Road to Mahim and Sion, and there were also many people living west of B. B. & C. I. and south of Dadar on the open flats as far as Worli Second Pacadi. Different communities had their separate camps, which were looked after by Committees, and these gave me great assistance. On the East of G. I. P. Railway many people were encamped and amongst others were a number of Ghaties from Jan Mahomed's Chawl at Dadar Road and these people gave much trouble.

The whole of the camps were placed under the District Officer with Mr. Harvey as Camp Master, who took over charge of his duties on the 17th December 1899. Mr. Harvey worked in conjunction with the sectional medical officers of the respective sections in which the camps were and called on them to diagnose cases of sickness, plague, &c. During his tour of duty Mr. Harvey was given the aid of 5 Police Ramosees and 6 Registration Ramosees who all did most excellent work. The number of cases of plague reported by Mr. Harvey was 69. The number of cholera cases was 5. The number of small-pox cases was 10. Cases not traceable were 4. Cases isolated, *nil*. Cases not fit to be removed, 2.

With regard to the help received from the Volunteers Mr. Dhurn and Mr. W. R. Kerker in the Dadar Camps, Rao Bahadur Trimbuk Vaidya and Mr. Pendse and Messrs. Pathuk and Hate in the Matoonga Camps, Mr. Lad and Mr. Rele and Mr. Manjrekar in the Vincent Road Camps, Mr. J. J. Barretto in Wadalla Camp, Rao Saheb N. Dalvi and Rao Saheb Sitaram Khanderao in the Sion Koli Camps, Mr. Mahale in the Mahim Camps, and the Patels in the Worli Koliwada gave me the greatest assistance, both in reporting cases and in seeing the camps kept clean.

The following is the account of the funds generously placed at the disposal of the Bombay Municipality by the Government of India for the construction of health camps, *vide* G. R. ⁶²⁹⁴/₆₄₀₅ P., of 17th November, 1898.

RECEIPTS and EXPENDITURE on Plague Camps during the year ending 31st May 1900.

Month and Date.	Receipts.	Amounts.	Expenditure.	Amounts.
		Rs. a. p.		Rs. a. p.
July 3rd, 1899	Opening balance ...	741 4 1	Erecting 100 huts for Julais at Byculla	750 8 9
October 17th, 1899	Received from the Accountant-General, Bombay ...	15,000 0 0	Do. additional huts at Goculdas Tejpal Camp	336 13 2
March 27th, 1900	Do. do. ...	25,000 0 0	Do. small huts for stores at Marine Lines	4 6 0
	Do. do. ...	50,000 0 0	Do. 100 additional huts at Churney Road	4,440 7 8
			Do. huts at Elphinstone Bridge Camp	5,215 12 4
			Constructing 30 huts Worli Pakhadi	720 15 1
	(a) Excludes Rs. 15,000 received on 3rd July 1899, erroneously shown in the Statement of Expenditure up to 31st May 1899.		Do. additional sheds at the Chowpatti Camp...	54 9 3
			Erecting segregation sheds at Elphinstone Road	2,270 5 5
			Do. do. at Mahim ...	1,443 0 0
			Do. 8 sheds at Mahim Compound, Tulsi Pipe Line	139 7 0
			Do. sheds at the Junction of Vincent Road	74 15 2
			Do. segregation sheds at Dadur ...	364 5 10
			Do. do. at Naigam Camp ...	317 8 11
			Constructing sheds at Arthur Crawford Market	523 8 6
			Do. segregation sheds at Victoria Bundar, Colaba	567 8 8
			Erecting new sheds at Vithal Sayana Camp, Colaba...	620 12 1
			Re-constructing sheds at do. do.	213 3 3
			Erecting sheds at Dadur and Vincent Road	366 2 9
			Do. at Vincent Road	804 13 0
			Do. at Naigam Road	236 0 0
			Do. at Dadur Road	380 11 0
			Constructing 28 rooms on Tardeo Flats	176 10 6
			Erecting camps at Ghorupdeo Road	1,245 6 3
			Constructing new camps at Goculdas Tejpal Health Camp	5,006 4 4
			Re-constructing Dhobhee Camp at Arthur Road Hospital	585 5 0
			Re-erecting camps at Chowpatti	622 12 9
			Erecting Mahomedan Camps at Morland Road	445 11 0
	Carried over ...	90,741 4 1	Carried over	27,927 15 8

RECEIPTS and EXPENDITURE on Plague Camps during the year ending 31st May 1900.

Month and Date.	Receipts.	Amounts.	Expenditure.	Amounts.
	Brought forward ...	Rs. 90,741 4 1		Rs. a. p. 27,927 15 8
			Erecting Mahomedan Camps at Narielwady ...	93 1 7
			Re-erection of old Churney Road Camps ...	527 0 0
			Erecting 20 rooms in the Camps, Beni Israel Hospital ...	831 15 2
			Renewing Camps at Narielwady ...	1,788 4 9
			Erecting Health Camps for Mahars at Gilder Street ...	307 12 4
			Do. camps for Hindoos at Morland Road... ..	1,042 4 6
			Do. do. for Mahars at do. ...	714 4 3
			Reconstructing Cruikshank Road Camp ...	305 0 4
			Putting tubs at Parsee Punchayet Camp ...	2 8 0
			Erecting Compound at Elphinstone Bridge Camp ...	93 6 6
			Water connection to different camps ...	8,284 0 10
			Drainage connection to different camps... ..	5,741 15 1
	Total Rupees ...	90,741 4 1	Total payment up to 31st May 1900...	47,109 9 0
			Balance in hand...	43,631 11 1
			Total Rupees...	90,741 4 1

NOTES—(a) In addition to this sum Rs. 2,755-10-8 have been paid from 1st June to 29th June 1900 and bills for Rs. 3,000 are under audit.

(b) Total receipts per account made up to 31st May 1899.	Rs. 60,000 0 0
" " as above to " 1900.	" 90,000 0 0
Total Expenditure per account made up to 31st May 1899.	Rs. 1,50,000 0 0
" " " " 1900.	59,258 11 11
" " " " 1900.	47,109 9 0
" " " " 1900.	1,06,368 4 11
Balance Rs.	43,631 11 1

CHAPTER VI.

Discretionary Relief.

The origin of the Discretionary Relief Fund, its purposes and the methods of its distribution were very fully described in last year's report.

Principles of Distribution.

The following extract from Capt. Lock's report is applicable *mutatis mutandis* to the whole City :—

"This fund is divided under three headings—(1) Hospital Relief, (2) Compensation, (3) Relief in Camps."

"(1). *Hospital Relief*.—The money spent under this heading has been (a) "to provide clothing to the patients on discharge, (b) to give each patient a small "amount of money to allow him to make a start.

"There is no doubt that nothing has gone further to popularise our hospitals than the care of the patients on discharge. They go away happy with some good clothes and a couple of rupees to show to friends who never expected to see them again. The allowance to a patient who has been over a month in hospital is Rs. 2 in cash with 1 blanket and for males, 1 bundy, 1 dhotie and 1 puggaree; for females, 1 saree and 1 chowlee. The cash is most acceptable to those patients sent out convalescent and not likely to be quite fit to start a hard day's work.

"(2). *Compensation*.—This is money spent in any kind of legitimate compensation—damage to property in disinfecting; necessary burning of badly soiled clothes of patients; payment of cart hire for taking kits of contacts and evicts to camps. Hard and fast rules are impossible and every discretion is used by me in assigning monies paid as compensation. In this district the amount paid in the year has been Rs. 1,119-13-3. I am of opinion that never had money been better spent and it has gone a long way to popularise our measures. The claims paid have been legitimate charges on the funds from which the money is drawn.

"(3). *Relief in Camps*.—Under this heading are sums paid for the temporary support of women and children in camps who have been rendered for the time destitute either owing to the death of the father or that the father is nursing his sick wife. There are a hundred ways in which such a fund can be legitimately and discreetly expended by a District Officer and there is nothing he is more thankful for than that he has such a fund to use. The amount spent in this district during the year has been Rs. 250-3-3."

Mr. Lund's report for the Arthur Road and Mahratta Hospitals.

Mr. George Lund most kindly continued to look after the distribution of the fund in the two principal hospitals—the Arthur Road and the Mahratta—and his report is given below:—

" Total for both Hospitals.

								Rs.	a.	p.
Convalescents	..	..	..	..	..	..	..	2,809	0	0
Contacts and Evicts	..	..	..	..	..	..	..	1,809	12	0
Clothing, biscuits, fruits, etc.	..	..	..	..	..	..	..	3,222	8	6
Total disbursements ..								Rs.	7,841	4 6

“The basis which I laid down for the administration of the fund was that each convalescent requiring assistance should receive Rs. 2 for food and Re. 1 for lodging. Those with a home to go to Rs. 2 for food. Bad recoveries and those with children or relatives dependent upon them an extra amount according to circumstances. Necessitous contacts whose relatives have died of plague have also been given help from the fund.

“Small quantities of blankets and clothing, an extra quality of brandy, bovril, and codliver oil and maltine, biscuits and fruits in their season have been provided. The two latter are immensely appreciated and are liberally distributed. Cards for the amusement of adults and toys for the children have been provided. Wheelbarrows, swings, and horses on wheels give the greatest amount of pleasure. Native clay toys which were originally brought were found to be too fragile, and too easily lost. Books have also been supplied to the few who could read. Early in the year I had the pleasure of distributing a large number of toys, dolls, etc., between the Modikhana, the Mahratta and Arthur Road Hospitals, most kindly sent out from England by Mrs. Woodburn.

“The Wards are frequently visited and enquiries made of the nursing Sisters for any deserving cases coming under their notice.

“In giving the money every effort is made to give it in such a way as to convince the recipients of the benevolent intentions of Government in its bestowal.

“That the fund is having a beneficial effect there is no question. The days for distribution of biscuits and fruits are eagerly looked forward to. Convalescents on discharge look for the help which they know awaits them. Voluntary admissions, I am told, have been much more frequent during this epidemic than last in both Hospitals.

“Owing to famine the sending of people to their homes has been much restricted. Great care has to be exercised at all times, as the request is often made with the sole object of trying to get more money by bribing the peon who is sent to the Railway Station not to purchase the ticket, but to give the money, reserving a portion for himself. This, the precautions taken, prevent him from doing if he would. Cases having occurred in which people have refused to go at the last moment, each person is now clearly given to understand that if any attempt at bribery is made or on refusal to go the whole grant will be forfeited.”

“The following are some of the typical cases which have been dealt with :—

“Gunnoo Bhiwa, having his mother dependent upon him, received rupees four.

“Tookeram Mahipati, a bad recovery and very weak, rupees five.

“Gewaki (a widow), old and decrepit, rupees six.

“Balaji Lakoba, 50 years of age, rupees four.

“Eshwadabai, widow with 3 children, rupees seven.

“Santoo Bhiwa, weakly woman with baby in arms, rupees six.

“Janoo Mahadoo, partially crippled after plague, rupees five.

“Aba, husband died of plague, was sent to her country at a cost of rupees seven.

“Ram Pursad, blind from plague, rupees five.

"Awtar Devi was 5 months in hospital and became a helpless cripple, as a special case he and his wife were sent to their country at a cost of rupees twenty-five.

"Gungabai, widow with 3 children, received rupees seven.

"Junki, widow, and her daughter, both quite destitute and friendless, were sent home at a cost of rupees twelve.

"Two widows, Aradabai and Chima, husbands died of plague, were sent home at a cost of rupees ten each.

"Gopal Babajee, who made a bad recovery, was sent to his relatives up-country at a cost of rupees eight.

"Baija Dhondi, widower with young child and grand-mother dependent on him, rupees eight.

"Tookeram Bapu, wife and 3 young children dependent on him, rupees six.

"Amena Hussan, no friends in Bombay, sent home at a cost of rupees five.

"Hurni Rowji, husband died of plague, left with 3 young children, received rupees ten.

"Eshi Kadari, an old man, whose son died of plague, was sent home at a cost of rupees five.

"Andi Balla, husband died of plague, left with one child, sent home at a cost of rupees eight.

"Chima, old woman, husband died of plague, received rupees four.

"Dustoori, widow, without friends in Bombay, sent to her country at a cost of rupees ten.

"Dewji Manaji and wife, both infirm, received rupees five.

"Balla Krishna, partially paralysed after plague, rupees five.

"Powli, woman, lower limbs paralysed, sent to her country at a cost of rupees ten.

"Mani, widow left with 3 children, received rupees eight.

"Orphans in the Mahratta Hospital.

"There are 10 orphans in that hospital under the care of the nursing Sisters, some of an age when instruction should be given to them preparatory to their being placed out in life. The creation of an orphanage has been talked about for some time, but so far nothing has been done. I hope some rich and philanthropic member of the community will come forward and establish such an institution, of which I believe there is not one in Bombay, in which I shall be happy to take any part in which I can be of use."

"GEORGE LUND,

"Official Plague Hospital Visitor,

Mahratha and Arthur Road Hospitals."

Statement of
Expenditure.

Below is a statement showing the amounts expended by the various officers to whom advances were entrusted:—

Statement of Expenditure incurred on Discretionary Relief from 27th May 1899 to Saturday, 2nd June 1900 (6 a.m.).

Date.		Amount.	Names of Officers.	Relief in Hospital.	Compensation.	Relief in Camp.	Total.
27th May 1899	To Opening Balance	Rs. a. p.	By Expenditure— Captain W. A. Cuppage	Rs. a. p. 5,436 13 9	Rs. a. p. 1,180 8 3	Rs. a. p. 3,583 14 6	Rs. a. p. 10,201 4 6
14th August 1899	To advances by Government—	.....	" Geo. Lund, Esq.	2,769 6 6	2,670 0 6	3,493 3 6	8,922 10 6
28th September 1899	.....	5,000 0 0	Captain A. T. Walling	6,422 1 0	.....	.....	6,422 1 0
29th January 1900	.....	10,000 0 0	R. Lock	40 10 0	721 2 0	2,559 15 6	8,321 11 6
29th March 1900	.....	10,000 0 0	Lt. W. C. French	1,508 0 9	1,088 3 3	235 11 3	2,831 15 3
22nd May 1900	.....	10,000 0 0	Capt. C. Boileau	62 12 0	671 7 0	2,083 1 0	2,817 4 0
			Lt. E. Dalgliesh	22 13 0	1,473 12 9	126 3 0	1,622 12 9
		45,000 0 0	Lt. L. B. Haworth	449 1 6	193 14 0	412 13 0	1,555 12 6
10th June 1899	To Refunds—		Captain W. H. Wooldridge	65 12 0	159 4 0	545 7 9	770 7 9
	Amounts erroneously shown as expenditure in the account of Dr. G. W. Lewis for week ending 27th May 1899	37 12 0	" A. Chichester	30 8 0	60 6 6	424 4 0	515 2 6
13th September 1899	Amount erroneously shown as expenditure in the account of Captain Lock during the week ending 9th September 1899	5 0 0	Captain G. A. Brownrigg	2 0 0	227 8 0	232 9 0	462 1 0
24th October 1899	Amount inadvertently debited by Captain Walling to Discretionary Relief Fund Account	88 4 6	Lt. G. Warneford	3 4 0	1 12 0	440 1 0	445 1 0
8th December 1899	Amount expended by Captain Lock on inoculation through inadvertence out of the Discretionary Relief Fund the same has now been adjusted against Municipal Contingent advance	145 4 6	Rao Bahadur N. T. Vaidya	49 12 0	192 0 0	194 3 6	435 15 6
	Amount erroneously shown by Lt. M. H. B. Geddes in excess in his account for the week ending 13th May 1900	0 8 0	Lt. M. H. B. Geddes	3 12 0	41 8 0	326 6 0	371 10 0
28th May 1900	Total Rs.	.....	By Balance	10 6 0	152 0 0	171 12 0	334 2 0
		276 13 0		15 12 0	155 3 9	10 10 0	181 9 9
		54,777 13 8		64 13 7	29 10 0	58 4 0	152 11 7
				106 12 0	6 0 0	.....	112 12 0
				.....	11 8 0	28 1 0	39 9 0
				2,484 12 5	40 0 0	511 6 0	3,036 2 5*
			Total	19,539 2 6	9,075 12 0	15,437 14 0	44,052 12 6
			By Balance	.....	.....	.....	13,725 1 2
							54,777 13 8

Note.—The standing advances to Officers were as follows:—

Captain W. A. Cuppage	Rs. a. p.	Rs. a. p.	• Messrs. Esufally Abdulaly & Co., for clothing supplied to Mabratta Hospital and to the District Officer, D.	Rs. a. p.
Geo. Lund, Esq.	700 0 0	250 0 0	Ward, for discharged patients	769 14 3
Captain A. T. Walling	700 0 0	250 0 0	Mr. Dosabhai Framji Dubash for rations supplied at Arthur Road Hospital	1,661 15 3
R. Lock	500 0 0	100 0 0	Mr. Limji Manekji for white caps supplied at Mabratta Hospital, etc., for distribution amongst discharged patients	45 13 4
Lt. W. C. French	200 0 0	250 0 9	Printing forms re Discretionary Relief Account Memos, for District Officers—	
Captain C. Boileau	200 0 0	200 0 0	Messrs. A. P. Cortez & Co.	Rs. 5 0 0
Lt. E. Dalgliesh	250 0 0	250 0 0	" Rastomji & Co.	" 4 8 0
Lt. L. B. Haworth	250 0 0	1,000 0 0	Clothing distributed by the District Officers, &c., amongst discharged patients from the Municipal Stores	9 8 0
		100 0 0	Repairing charges for old blankets distributed amongst discharged patients	511 6 0
			Cart hire for removal of baggage, &c., from overcrowded localities to camps	7 9 7
				40 0 0
			Total	3,036 2 5

CHAPTER VII.

Volunteers.

Number of Volunteers.

The total number of volunteers on the various committees in each district is marginally shewn.					But as will appear from the list at the end of this chapter, only about one-fourth of these did any useful work. The remaining three-fourths were purely ornamental. This is not very greatly to be wondered at. Many of these gentlemen have been working hard for more than three years, and almost all have now been volunteers for more than two. The work is of a distasteful character,				
A Ward	...	...	...	27					
B Ward (South)	...	...	...	27					
B Ward (North)	...	...	...	33					
C Ward	...	...	...	213					
D Ward	...	...	...	176					
E Ward (West)	...	...	...	30					
E Ward (Byculla)	...	...	...	7					
E Ward (Wari Bandar)	...	...	...	4					
F and G Wards	...	...	...	67					
Central District	...	...	...	142					
Total...				<u>736</u>					

and monotonous in the extreme ; its dangers remain, but its novelty has worn off. Every endeavour was made to stimulate the jaded, but admonitions and appeals alike fell flat. All the greater credit is due to those who continued to work.

Work of Vo- lunteers.

In A Ward, and E Ward, West, the volunteers, as a body, have stuck to their self-imposed duties not only steadily, but enthusiastically. Their services were always at the disposal of the District Officer whenever any trouble or difficulty arose, they helped in discovering cases, in removing cases, in evacuating houses, in superintending disinfection, in distributing relief, in inoculation, and in every branch of the District Officer's work. The volunteers in E Ward, West, were in addition most regular in visiting every part of their district, and the very large number of cases of sickness reported by them is a testimony to the efficiency of their work. In A Ward this branch of voluntary work was hardly so good as in the past ; but the Colaba volunteers continued to maintain the Stuart Strong Hospital, and devoted much time and trouble to making it popular and successful.

In B Ward, North, very similar remarks apply. Excellent work was done by several of the volunteers, and most of them did some work, but they required a good deal of stimulating. Regarding the Naigaum Committee in F Ward, Captain Boileau writes :—

“These gentlemen have devoted themselves to their work, and I have practically left their section to them. They visited the whole section daily after hearing the registration Ramosi's reports in the morning, and either removed the sick, registered the contacts' names, saw them off to hospital or camp, or carried out evacuation as the cases required. Nothing seems to have escaped them, and no cases that I could hear of were missed.”

“In addition to this, they, from their own funds, contributed Rs. 2,500 to the upkeep of the Sarvajanic Hospital in which many lives were saved, the high percentage of 31 being reached. This hospital formed part of their daily round, and

“ I do not think any morning passed without some one of the Committee seeing all the patients and encouraging them with a few kind words. I do not know how Committees work in other wards, but the system employed by this Committee seems perfect.”

In B Ward, South, the assistance rendered by the volunteers as a whole was small, some three or four gentlemen helped the District Officer regularly ; the others mentioned were willing to use their influence when specially called upon ; but the remainder were as often a hindrance as a help.

Out of 213 volunteers in C Ward, only 36 have been considered deserving of mention. But of this small remnant it would be difficult to appreciate the services too highly ; they threw themselves heart and soul into their work, whatever it might be, and there were few of them who did not devote several hours a day to plague work throughout the epidemic. The population of this district is roughly 1,75,000, and though 36 volunteers may seem a small number to cope with such a heavy charge, this in itself gave a very high value to the assistance of each individual.

Similar remarks apply to the majority of the gentlemen mentioned at the end of this para. in Byculla, Wari Bandar, F and G Wards, and the Central District. With few exceptions they were at work every day, going round either by themselves or with the District Officers or Medical Officers. They are men whose character and grit has been well tested, they have earned the respect and esteem of the British officers whom they have helped, and their tact and uprightness has won them the confidence of the people. For those who feel how helpless they would have been if men of this character had stood aloof it is difficult to find words which will give any adequate idea of the value of the services they have rendered. The plague administration owes them a heavy debt of gratitude.

Names of Volunteers whose Services have been valuable.

The names of those volunteers who have done real work during the year are given below :—

Names.	Names.
<i>A Ward.</i>	<i>A Ward—continued</i>
Mr. Nasarwanji Navroji Gazdar.	Mr. Paidal David.
„ Damodar Gowardhandas Sukhatwala.	„ Carl Hummel.
„ Bashrudin Nurudin.	„ H. Crawford.
„ Mahomed Ibrahim Mahomed Mizan Sendole.	„ Ardesbir Navroji Gazdar.
Khan Bahadur Bonanji Pyramji Patel.	Dr. R. T. Nariman.
Khan Saheb Maneckji Cursetji Chandana.	„ B. N. Darabshet.
Mr. Harischandra Vishram Rajwadhar.	„ N. N. Katrak
„ Merwanji Dadabhoy Colabawala.	„ D. N. Saher.
„ Gopal Naga Patel.	„ J. C. Jehangir.
„ Kureetji Rattotji Cama.	Mr. Bapuji Pestanji Dhondi.
Khar Saheb Mahomed Faridudin.	Shams-ul-Ulama Jivanji Jamsetji Modi.
	Dr. and Mrs. C. H. B. Adams Wylie.

Names.	Names.
<i>B Ward, South.</i>	
Rao Bahadur K. N. Saelor.	Mr. Madhavrao Bhai.
Mr. Goverdhandas Haridas Waidya.	„ Vithaldas Pranjivandas.
Khan Saheb David Solomon.	„ Mahdavi Lal.
Mr. Keshavji Kuvarji.	„ Puranmal Gulji Singhani.
Rao Bahadur Karamsi Damji.	Rao Saheb Mohanji Pranjivandas Gangawala.
Rao Saheb Gopalidas Khushaldas.	Dr. Framji Shapurji.
Khan Saheb Kazi Mahomed Ali Rogay.	Rao Saheb Mullooji Narsuji.
Mr. Harjivan Meghji.	Rao Saheb Cashinath Moorkar.
„ Purshotam Yadhowji.	Rao Saheb Mulji Narayen.
„ Gopal Damji.	Mr. Vithaldas Jivandas.
„ Nanabhai Kashinath.	
„ Rattousi Govindji.	<i>D Ward.</i>
<i>B Ward, North.</i>	
Rao Bahadur V. C. Vandekar.	Khan Saheb Gulam Hussein Rogay.
Mr. Shivram V. Kandalkar.	Dr. Framji Shapurji.
„ Bhaskar Bhivaji.	Khan Bahadur Byramji Dadabhoy.
„ Krishnaji Bapuji.	Khan Saheb David Solomon.
„ Ramchandra Vandekar.	Mr. M. D. Dadysheff.
„ V. S. Naringrekar.	„ Sundarnath D. Khote.
Rao Saheb Balkrishna Bhivaji.	„ N. V. Mandlik.
Mr. Sakharan Kandalkar.	„ V. R. Bhawe.
„ G. Moses.	Dr. A. D. Mody.
„ Elijah Solomon.	„ H. B. Naik.
Khan Saheb David Solomon.	„ D. B. Naik.
Khan Saheb Saleh Mahomed Ibrahim.	Mr. P. B. Joshi.
	„ Nowroji Kursetji Thanawala.
	„ B. Sakharanji.
	Dr. H. N. Seervai.
	„ A. H. Ghaswala.
	Lt.-Col. T. A. Freeman.
	Dr. M. D. Cama.
	Mr. Hirji Pestonji Dinshaw Adenwala.
	„ Kursetji F. N. Daver.
	<i>E Ward, West.</i>
	Rao Saheb D. K. Desai.
	Mr. P. C. Daroowalla.
	„ Kondaji Gunpat.
	Rao Saheb Dr. V. P. Chavan.
	Dr. P. J. Swami.
	Rao Saheb Manuji Ragooji.
	Mr. Sittaram Luximon.
	„ Abdool Rahiman.
	„ Siwji Lingoo.
	Khan Saheb A. S. Moos.
	Mr. Gunpat Anaji.
	„ Bhiwaji Shiwaji.
	„ Chandu Parsad.
	„ Maloo Laximan Zilker.
	Late Khan Saheb Sheik A. Kadir.
	Mr. J. C. Karadi.
	„ Bomanji Shiwaji.
	Khan Saheb C. E. Patel.
	Mr. Ramzanbai Babanbai.

Names.	Names.
<i>E Ward, West—continued.</i>	<i>F & G Wards—continued.</i>
Mr. Lowji Megji.	Mr. R. R. Bhosla.
Khan Saheb E. Hafiz.	„ M. Shapurji.
Rao Bahadur Ellapa Ballaram, J. P.	„ B. Maneck Patel.
Mr. Hari Luximon.	Dr. S. S. Batliwala.
„ Narsingrao Sayaboo, J. P.	<i>Central District.</i>
Khan Bahadur Hakim Dyem, J. P.	Sirdar Casim Haji Mitha.
<i>E Ward, Byculla.</i>	Khan Bahadur Hakim Mahomed Dayem.
Khan Bahadur Samuel Isaji.	Khan Bahadur Abdur Rahiman Kadwani.
Mr. Gopinath Atmaram.	Khan Bahadur Abdur Razzak bin Curtas.
„ James Macdonald.	Khan Saheb Hassanali Mulla Hakimji.
<i>E Ward, Wari Bundar.</i>	Khan Saheb Haji Ibrahim Haji Sumar Patel.
Mr. George Lund.	Sirdar Umar Jamal.
„ S. S. Somakh.	Mr. Abdul Ali Karimbhoy.
Khan Saheb B. R. Ashburner.	„ Mahomed Ibrahim Tungekar.
<i>F & G Wards.</i>	Khan Saheb Saleh Mahomed.
Rao Bahadur Vassanji Khimji.	Mr. Vallabji Punjabhai.
Rao Saheb Sitaram Khanderao.	„ Mehran Khodabhai.
Rao Saheb A. N. Dalvi.	„ Kanji Udhavji.
Khan Saheb Shaikh Adam Essoofbhoy.	Khan Saheb Mirza Mahomed Shirazi.
Mr. D. C. Athaide.	Mr. Sitaram Keshao Bole.
Khan Saheb David Solomon.	„ Badrudin Abdulla Kur.
Mr. J. F. Madon.	„ Devji Bhikaji.
„ W. R. Jaykar.	„ Narayendas Laxmandas.
„ Dongersi Bhimji.	„ Abdul Hussein Dawudbhay.
„ K. N. Mahale.	„ Abdul Rahiman.
„ Ebrahim Dadu Munshi.	„ Mahomed Hussein.
„ Dharmaji Pragji.	Shaikh Burhan Shaikh Chand.
„ N. Moroba.	Mr. Ibrahim Adamji Peerbhoy.
„ D. Vasudeo R. Acharya.	Haji Suleman Abdul Wahed.
„ Isaac Pezzarkar.	Mr. Mir Mahomed Khandwani.
„ Samuel S. Mazgaumkar.	Haji Ismail Haji Harun Zakria.
„ J. B. D. Jijibhoy.	Mr. Kasambhai Moosa.
„ Marshall.	<i>Otherwise than in District Work.</i>
	Dr. Sir Bhalchandra Krishna Bhatawadekar.
	Sir Dinshah Manekji Petit, Bart.
	Sirdar Mir Abdul Ali.
	Mr. Adamji Pirbhoy.

1961 During the year death carried off six most loyal workers.

Rao Saheb Cashinath Moorker.
Khan Saheb Shaikh Abdul Kadir.
Mr. P. F. Bhandara.

Mr. Krishnaji Annaji Halde.
Lieut. C. H. B. Adams Wylie, I.M.S.
Lieut.-Col. Freeman.

CHAPTER VIII.

Staff and Expenditure.

Staff.

The following Statements A. and B. show the maximum Plague staff engaged during the past epidemic in the Special Plague Department and the ordinary Municipal Departments, respectively. This does not include the Special Medical Officer or his Assistant, the Deputy Commissioner, the Military Officers, or the Lady Nurses, who are all paid by Government.

The Maximum Plague Staff main

Designation and Pay of the Appointment.	A Ward, including Vithal Sayana Camp and Cruckshank Road Camp.	B Ward North, including Elphinstone Bridge Camp.	B Ward South.	C Ward, including Gokaldas Tejpal Health Camp and Charni Road Health Camp.	D Ward, including Chowpati and Grant Road Health Camps.	E Ward West, including Gilder Street and Foras Road Camp and Elappa Balaram Camp.	E Ward East, Bycul'a.	E Ward North and Charni Road
Assistant District Officer ... ..at Rs. 175	Mr. J. W. Green	.....	.....	.....	.....	.....	.....	.....
District Superintendent" 250	Mr. R. H. Vin- cent.	.....	.....
Medical Officer, Sectional" 250	Dr. N.K. Arjani	Dr. A. V. De Quadros.	Dr. P. M. Mathai.	Dr. D. R. Bardi	Dr. A. D. Contractor.	Dr. N. E. Chubb	Dr. V. B. Jay- kor.	Dr. R.
Do. do. do." 250	" V. D. Affin- walla.	" C. L. De Avoine.	" S. D. Nadirsah	" K. M. Gimi	" A. J. De- Gama.	" M. N. Kapa- dia.	.....	.....
Do. do. do." 250	" H. J. Kham- batta.	.....	" D. R. Khote	.....	.....
Do. do. do." 200	Mr. F. P. Mas- ter	Dr. D. P. Seth- na.	.....	Mr. N. C. Cama.	.....	.....	Dr. K. S. Pad- nekar.	Mr. S.
Do. do. do." 200	" G. R. Tam- be.	.....	.....	.....	.....	.....	Dr. H.
Do. do. do." 200
Do. do. Chief" 300
Do. do. do." 250
Do. do. Hakim" 125
Do. do. Assistant... .." 125	Mr. D. R. Barve.	.....	.....	.....
Do. do. do." 100
Do. do. for Camps" 120	Mr. P. J. De- Souza.	.....	.....	.....	.....
House Surgeon" 150
Do. do." 50
Nurse, Visiting" 150
Do. Hospital ... ..at Rs. 145+10
Superintendent, Disinfection ... ..at Rs. 125	Mr. J. Holborn	.....	.....	.....	.....
Inspector, Contact" 120	" J. Clarke	.....	.....	.....	.....
Camp Master" 120	Mr. H.
Do. do." 50
Do. do." 40	1	.....	1	.....	.....	.....	.....
Do. do." 35	1	.....	.....	.....	.....
Do. do." 30	2	.....	.....	.....
Do. do." 25
Do. do." 20	2	.....	.....	.....	.....	.....	.....	.....
Do. do." 15	1	.....	.....
Superintendent of Private Health Camps" 100
Sub-Inspectors, Contact" 75	1	.....	.....	.....	.....
Do. do." 50
Do. do." 40	1	.....	.....	.....	1	.....
Do. do." 30
Do. Disinfection" 70	3	.....	.....
Do. do." 60	1	.....	.....
Do. do." 50	2	.....	.....	.....	.....	1	.....
Do. do." 45
Do. do." 40	1	3	.....	2	1	.....	1	.....
Do. do." 35	1	.....	1	.....	.....	.....	.....
Do. do." 30	2	.....	2	.....	.....	.....
Do. do." 25
Do. do." 20	2	3	.....	1	1	.....	2	2
Do. do." 15
Do. Stores" 50
Storekeeper... .." 50
Office Peons" 14	1	.....	.....	.....	.....	.....
Do. do." 12
Do. do." 11-8	1	.....	1
Do. do." 11	1	.....	.....	.....	.....	.....	.....
Do. do." 10	2	.....	.....	.....
Do. do." 9	1	.....	.....	.....	.....	.....
Do. do." 8	1	.....	.....	.....	.....	.....	.....
Hospital Assistants" 60
Do. do." 55
Do. do." 45
Do. do." 40
Do. do. allowance" 10
Vaidya" 45
Hakim" 30
Do." 15
Carried over ...	6	13	7	11	15	11	9	.....

A.
during the Fourth Epidemic.

F and G Wards, including Stores Depot at Government House, Parcel.	Central District, including Byculla, Northbrook Garden, Umer- khadi and Peru Lane Camps.	Maratha Hospital.	Modi- khana Hospital.	General Mahome- dan Hos- pital.	Sunni Jinal Hospital.	Mahim Hospital.	Hindu Fever Hospital at Charni Road Gardens.	Staff for Private Health Camps.	Disinfection staff at Forts Road.	Staff for the Son- pur, Hahes Road, Tank Bund & r. Hindu and Maho- medan Cemeteries.	Staff at J. J. Hos- pital.	Staff for the Pal- tan Road Stores.	Total Strength.	Amount.
.....	1 at Rs. 175	Rs. a. p.
.....	1 ,, 250	175 0 0
r. H. Dady Bar- jor. †	Dr. M. K. Munshi.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	20 ,, 250	5,000 0 0
H. K. Tavarla	" H. F. Ahmed.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10 ,, 200	2,000 0 0
r. J. S. Nerurker.	1 ,, 300	300 0 0
Abraham Esaklel.	2 ,, 250	500 0 0
r. E. H. Hate	Dr. L. B. Dhargalkar	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1 ,, 125	125 0 0
.....	Dr. D. A. Turkhed.	.....	.....	Dr. P. D. Hormasji	.....	.....	.....	.....	.....	.....	1 ,, 125	125 0 0
r. G. V. Lad.	Mr. Sk. A. Kadir.	.....	.....	Mr. T. Ra- hman	.....	.....	.....	.....	.....	.....	.....	.....	2 ,, 100	200 0 0
.....	1 ,, 120	120 0 0
.....	Mr. Santo- oji Ramji	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1 ,, 150	150 0 0
.....	Mr. P. J. Divatia.*	.....	.....	.....	.....	.....	1 ,, 50	50 0 0
.....	Mrs. B. Myor.	.....	.....	.....	.....	Mrs. Barr.	.....	.....	.....	.....	.....	.....	1 ,, 150	150 0 0
.....	Mr. Geo. Guider.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1 ,, 125	125 0 0
.....	1 ,, 120	120 0 0
.....	1 ,, 120	120 0 0
1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3 ,, 50	150 0 0
.....	2 ,, 40	80 0 0
.....	1 ,, 35	35 0 0
.....	3 ,, 30	90 0 0
.....	1 ,, 25	25 0 0
.....	2 ,, 20	40 0 0
.....	1 ,, 15	15 0 0
.....	Mr. E. R. F. Glen.	.....	.....	.....	.....	.....	1 ,, 100	100 0 0
.....	1 ,, 75	75 0 0
.....	1 ,, 50	50 0 0
.....	4 ,, 40	160 0 0
.....	1 ,, 30	30 0 0
.....	3 ,, 70	210 0 0
1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4 ,, 60	240 0 0
.....	5 ,, 50	250 0 0
1	1 ,, 45	45 0 0
1	12 ,, 40	480 0 0
.....	2 ,, 35	70 0 0
5	14 ,, 30	420 0 0
2	2 ,, 25	50 0 0
.....	4 ,, 30	120 0 0
.....	1 ,, 70	70 0 0
1	5 ,, 50	250 0 0
.....	6 ,, 40	240 0 0
.....	3 ,, 35	105 0 0
.....	8 ,, 30	240 0 0
1	7 ,, 25	175 0 0
1	18 ,, 20	360 0 0
.....	2 ,, 15	30 0 0
.....	1 ,, 50	50 0 0
.....	1 ,, 14	14 0 0
.....	1 ,, 12	12 0 0
.....	7 ,, 11-8	80 8 0
1	2 ,, 11	22 0 0
.....	4 ,, 10	40 0 0
.....	1 ,, 9	9 0 0
.....	1 ,, 8	8 0 0
1	3 ,, 60	180 0 0
.....	1 ,, 55	55 0 0
.....	1 ,, 45	45 0 0
.....	1 ,, 40	40 0 0
.....	4 ,, 10	40 0 0
.....	1 ,, 45	45 0 0
.....	1 ,, 30	30 0 0
.....	2 ,, 15	30 0 0
.....	1 ,, 30	30 0 0
24	27	10	6	5	3	1	4	2	1	4	.....	.....	.....	14,725 8 0

* Draws Rs. 100 more from the Hospital Committee.

† Draws Rs. 10 more as house allowance.

STATEMENT

The Maximum Plague Staff main

Designation and Pay of the Appointment.	A Ward, including Vithal Sayana Camp and Cruickshank Road Camp.	B Ward, North, including Elphinstone Bridge Camp.	B Ward, South.	C Ward, including Gokaldas Tejpal Health Camp and Charni Road Health Camp.	D Ward, including Chowpaty and Grant Road Health Camps.	E Ward, West, including Gilder Street and Foras Road Camps and Elappa Balaram Camp.	E Ward, East, Byeulla.	E Ward, North.
Brought forward ...	10	17	9	18	18	15	11	
Compounders ... at Rs. 30
Do. ... " 25
Do. ... " 15
Dresser ... " 18
Corpse-bearers ... " 20
Poultice boys ... " 10
Punkha boys ... " 10
Supervisors ... " 30
Messengers ... " 12
Do. ... " 11
Karkoons ... allowance " 2-8
Bluisty ... " 15
Do. ... " 11-8	1	.....	.....	.....	.....
Plumber ... " 20
Locksmiths ... " 20	2	.....	.....	.....	.....
Do. ... " 15	1	.....	.....
Muccadums ... " 25	1	.....	.....	.....	.....
Do. ... " 30
Do. ... " 15	1	.....	3	5	2	1	.....	1
Do. ... " 12
Coolies, Stores ... " 13-8
Do. do. ... " 11-8
Do. do. Disinfection ... " 11-8	13	13	54	70	39	42	.....	1
Do. do. do. ... " 10	13	.....	.....	.....	.....	.....	30
Do. Ambulance ... " 11-8	7	11	.....	24	12	9	.....	8
Do. do. do. ... " 10	6	.....	.....	.....	.....	.....	.....
Do. Inoculation ... " 11-8	2
Do. do. do. ... " 11	2	.....	.....	.....	.....	.....	.....
Do. Camp ... " 11-8	6	.....	.....	.....	.....
Do. do. do. ... " 11	1	.....	.....	.....	.....	.....	.....	.....
Do. do. do. ... " 10-8
Do. do. do. ... " 6
Do. Lime-washing ... " 11-8
Do. Road-repairing ... per day " 0-6
Watchmen ... " 11	6	.....	.....	.....
Death Registration Naik... " 15	1
Do. do. Ramosis ... " 11	16	15	14	35	23	20	.....	18
Tile-turners ... " 16-8	1	.....	.....
Do. ... " 15	2	.....	.....
Do. ... " 11-8	3	.....	2	14	.....	.....	.....
Engine drivers ... " 30	1	.....	.....
Do. boy ... " 12
Do. cleaner ... " 11-8
Do. cooly ... " 11
Malli ... " 7	1	.....	.....	.....	.....	.....	.....	.....
Lampmen ... " 11-8	2	.....	.....	2
Do. ... " 11	1	.....	.....	.....	.....	.....	.....	.....
Do. ... " 9	3	1	.....	.....	.....	.....	.....
Do. ... " 3	1	.....	.....
Kettlemen ... " 9	3	1	.....	3	.....	.....	.....
Bhangies ... " 15
Do. ... " 11-8	4	.....	.....	6	6	4	.....	.....
Sweepers ... " 11-8	5	.....	.....	6	.....	15	.....	.....
Do. ... " 9	4	2	.....	.....
Cart-drivers, night-soil ... " 12	1	.....	.....	.....	.....
Do. do. do. ... " 11-8
Scavengers, Camp ... " 11-8	6	.....	.....	.....	.....	.....	.....
Ayaks ... " 15	1
Do. ... " 12
Do. ... " 11
Ward-boys ... " 15
Do. ... " 12
Cooks ... " 15
Do. ... " 12
Do. ... " 10
Dhobies ... " 25
Do. ... " 15
Do. ... " 14
Do. ... " 12
Do. ... " 10
Police Ramosis* ... " 11-4	9	4	9	12	10	7	.....	5
Policeman* ... " 12-6	1
Total ... Rs.	68	95	91	189	139	121	81	

* Plus Re. 1-8-0 grain compensation.

All persons drawing less than Rs. 16

- continued.

uring the Fourth Epidemic—continued.

and G Wards, including Stores Depot Government House, Parel.	Central District, including Byculla, Northbrook Garden, Umar- khadi and Peu Lane Camps.	Maratha Hospital.	Modi- khara Hospital.	General Mahome- dan Hos- pital.	Sunni Jalal Hospital.	Mahira Hospital.	Hindu Fever Hospital at Charni Road Gardens.	Staff for Private Health Camps.	Disinfection Staff at Poras Road.	Staff for the Sona- pur, Harn's Road Tank B u n d e r Hindu and Maho- medan Cemeteries.	Staff at J. J. Hos- pital.	Staff for the Pal- tan Road Stores.	Total Strength.	Amount.
24	27	10	6	5	3	1	4	2	1	4	...	...	.....	Rs. a. p. 14,725 8 0
.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1 at Rs. 25	25 0 0
.....	.....	1	.....	.....	1	.....	1	.....	.....	.....	.....	.....	3 " 15	45 0 0
.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	1 " 18	18 0 0
.....	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2 " 20	40 0 0
.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1 " 10	10 0 0
.....	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2 " 10	20 0 0
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	.....	.....	3 " 30	90 0 0
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6	.....	.....	6 " 12	72 0 0
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	9	.....	.....	9 " 11	99 0 0
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	.....	.....	4 " 2-8	10 0 0
.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1 " 15	15 0 0
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1 " 11-8	11 8 0
1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1 " 20	20 0 0
.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2 " 20	40 0 0
.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2 " 15	30 0 0
.....	6	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1 " 25	25 0 0
1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	3 " 26	60 0 0
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	22 " 15	330 0 0
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1 " 12	12 0 0
4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4 " 15	60 0 0
.....	.....	.....	.....	.....	.....	.....	.....	.....	3	.....	.....	.....	3 " 13-8	40 8 0
.....	.....	.....	.....	.....	.....	.....	.....	.....	3	.....	.....	2	6 " 11-8	69 0 0
64	69	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	426 " 11-8	4,899 0 0
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	13 " 10	130 0 0
22	13	.....	2	.....	.....	.....	.....	.....	.....	.....	2	.....	123 " 11-8	1,403 0 0
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6 " 10	60 0 0
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2 " 11-8	23 0 0
.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4 " 11	44 0 0
1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	15 " 11-8	172 8 0
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1 " 11	11 0 0
.....	.....	.....	.....	.....	.....	.....	.....	18	.....	.....	.....	.....	18 " 10-8	189 0 0
.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2 " 6	12 0 0
.....	.....	12	5	.....	.....	.....	.....	.....	.....	.....	.....	.....	17 " 11-8	195 8 0
.....	.....	24	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	24 days at Rs. 6	270 0 0
50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6 at Rs. 11	66 0 0
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2 " 15	30 0 0
.....	54	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	267 " 11	2,937 8 0
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1 " 16-8	16 0 0
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2 " 15	30 8 0
.....	4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	23 " 11-8	264 0 0
.....	1	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	3 " 30	90 0 0
.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	1 " 12	12 0 0
.....	.....	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	2 " 11-8	23 0 0
.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1 " 11	11 0 0
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1 " 7	7 0 0
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4 " 11-8	46 0 0
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1 " 11	11 0 0
.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1 " 10	10 0 0
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4 " 9	36 0 0
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1 " 3	3 0 0
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	7 " 9	63 0 0
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3 " 15	45 8 0
.....	13	21	8	2	3	.....	.....	.....	.....	.....	.....	.....	85 " 11-8	977 8 0
.....	.....	.....	8	1	.....	.....	.....	.....	.....	.....	.....	.....	37 " 11-8	425 0 0
.....	16	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	22 " 9	198 0 0
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1 " 12	12 0 0
.....	1	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	2 " 11-8	23 8 0
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	7 " 11-8	80 0 0
.....	.....	13	4	3	3	2	.....	.....	.....	.....	.....	.....	26 " 15	390 0 0
.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2 " 12	24 0 0
.....	.....	.....	.....	.....	.....	.....	2	.....	.....	.....	.....	.....	2 " 11	22 0 0
.....	16	2	.....	.....	5	.....	.....	.....	.....	.....	.....	.....	23 " 15	345 0 0
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	22 " 12	264 0 0
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4 " 15	60 0 0
.....	.....	2	1	.....	1	.....	1	.....	.....	.....	.....	.....	4 " 12	48 0 0
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2 " 10	20 0 0
.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1 " 25	25 0 0
.....	.....	2	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	4 " 16	60 0 0
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1 " 14	14 0 0
.....	.....	.....	1	1	.....	.....	1	.....	.....	.....	.....	.....	2 " 12	24 0 0
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1 " 10	10 0 0
18	10	2	4	3	.....	.....	2	10	.....	.....	.....	.....	114 " 12-12	1,453 8 0
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1 " 1-14	13 14 0
185	224	113	59	21	17	13	18	43	7	26	2	3	1,621	31,467 6 0

allowed a rupee more for grain compensation.

Statement

Maximum Plague Staff in different Municipal

DESIGNATION.	Health Department.					Arthur Road Hos- pital.	Bandora Slaughter- house Hospital.	Parel Laboratory.
	Head Office.	No. 1 Divn.	No. 2 Divn.	No. 3 Divn.	No. 4 Divn.			
Special Assistant Engineer... at Rs. 400
Assistant to Chief Accountant ... ,, 300
Special Assistant Engineer ... at Rs. 200+50
Inspectors at Rs. 125
„ 100
„ 80
Clerk, Office 80
„ „ 75
„ Pay 70
„ Office 60
„ Pay 55
„ Office 50
„ Notice 50
„ Office 45
„ „ 40
„ Notice 40
„ Office 35
„ „ 30	11	...	...	...	...	...	...	...
„ „ 28	1	...	...
„ „ 25	2	...	...
„ „ Extra Allowance 20
„ „ „ 50
„ „ „ 30	1	...	...	...	...	...	...	...
„ „ „ 25
„ „ „ 20
„ „ „ 15	1	...	...	...	...	...	...	...
Store Inspector, Extra Allowance 70
„ Assistant 100+30
Medical men 750	1
„ „ 500	1
„ „ 250	1	...	...
„ „ 200	1	...	...	...	...	...
Hospital Assistant ... Rs. 35 + 25 + 10	1	...	...	...	...
„ „ ... Rs. 25 + 25 + 10 + 20	1	...	...
„ „ ... Rs. 25 + 25 + 10	1	...	...	...	...	...
„ „ ... Rs. 50	1	...	...	...
„ „ ... 45	1	...	...
Compounder 20	1	...	1
Veterinary Surgeon (allowance) 50	1
Engine Driver 30	1	...	...
Carried over ...	13	...	2	1	1	8	...	4

B.

Departments during the Fourth Epidemic.

Chief Accountant's Department, in- cluding Stores Branch.	House Inspection Staff.	Drainage Depart- ment Staff.	Commissioner's Office Staff.	Camps & Hospitals, excluding Arthur Road and Pan- dora Hospitals.	Total Number.	Total amount per month.	NAMES.
						Rs. a. p.	
...	1	...	...	...	1	400 0 0	Mr. J. D. Nadershaw.
1	...	...	...	...	1	300 0 0	„ Rattonji Fardunji Khambatta.
...	1	...	...	...	1	250 0 0	„ Nowroji D. Katrack.
...	2	...	...	...	2	250 0 0	Messrs. M. M. Mistri and A. K. Dadachanji.
...	11*	...	...	...	11	1,100 0 0	* Messrs. N. J. Billimoria, J. H. Karanjia,
...	1	...	...	...	1	80 0 0	N. D. Mistri, J. M. Fitter, M. J. V. Ross,
1	...	...	...	...	1	80 0 0	F. S. Bharucha, B. K. Banna, R. D. Kanga,
...	...	1	...	...	1	75 0 0	H. F. Dias, J. S. Langrana, and R. W. Whitham.
1	...	...	...	...	1	70 0 0	
1	...	...	...	...	1	60 0 0	
1	...	...	...	...	1	55 0 0	
...	1	...	1	...	2	100 0 0	
...	3	...	...	...	3	150 0 0	
1	...	...	...	...	1	45 0 0	
2	1	...	1	...	4	160 0 0	
...	1	...	...	...	1	40 0 0	
1	...	...	3	...	4	140 0 0	
...	5	...	3	...	19	570 0 0	
...	...	...	...	...	1	28 0 0	
1	1	...	2	...	6	150 0 0	
2	3	...	2	...	7	140 0 0	
1	...	...	...	...	1	50 0 0	Mr. Bal Nilaji Pitale.
...	...	...	...	...	1	30 0 0	
1	...	...	...	...	1	25 0 0	
...	1	...	...	...	1	20 0 0	
...	...	...	1	...	2	30 0 0	
1	...	...	...	...	1	70 0 0	Mr. H. Wald.
1	...	...	...	...	1	130 0 0	„ J. M. Govendar.
...	...	...	...	...	1	750 0 0	Dr. Polverini.
...	...	...	...	...	1	500 0 0	„ Mayr.
...	...	...	...	...	1	250 0 0	„ D. C. Sethna.
...	...	...	...	...	1	200 0 0	„ Dorabsett.
...	...	...	...	...	1	70 0 0	
...	...	...	...	...	1	80 0 0	
...	...	...	...	...	1	60 0 0	
...	...	...	...	...	1	50 0 0	
...	...	...	...	...	1	45 0 0	
...	...	...	...	...	2	40 0 0	
...	...	...	...	...	1	50 0 0	Mr. Sorab N. Ranina.
...	...	...	...	...	1	30 0 0	
16	32	1	13	...	71	6,723 0 0	

Statement

Maximum Plague Staff in different Municipal

DESIGNATION.					Health Departments.					Arthur Road Hospital.	Bandora Slaughter-house Hospital.	Parel Laboratory.
					Head Office.	No. 1 Divn.	No. 2 Divn.	No. 3 Divn.	No. 4 Divn.			
Brought forward ...					13	...	2	1	1	8	...	4
Campmaster	...	...	...	Rs. 20	...	...	...	...	...	...	...	...
Nurses	...	...	Rs. 100 + 1-8	per day.	...	...	...	...	...	4	...	...
Ayabs	...	...	...	Rs. 30	...	...	...	...	...	1	...	...
"	...	...	...	" 15	...	...	...	...	...	4	...	...
Ward boys	...	...	...	" 25	...	...	...	...	...	1	...	...
"	...	...	...	" 15	...	...	...	...	...	13	...	...
"	...	...	...	" 12	...	...	...	...	...	38	...	...
Masons	...	...	...	Re. 1 per day.	...	...	...	...	...	...	...	...
Fitter	...	...	...	" 1 "	...	...	...	...	...	...	...	...
Mucadum	...	...	...	Ans. 12 "	...	...	...	...	...	...	...	...
Coolies	...	...	...	" 7 "	...	...	...	...	...	...	...	...
"	...	...	...	" 5 "	...	...	...	...	...	...	...	...
Lascars	...	...	Rs. 10	per month.	...	...	...	...	...	...	...	...
Watchmen...	...	...	" 10	"	...	...	...	...	...	...	...	...
Bhisty	...	...	" 15	"	...	...	...	...	...	1	...	...
Bicycle boy	...	...	" 15	"	1	...	...	...	...	...	...	...
Biggaries	...	...	" 12	"	...	...	...	...	...	2	...	...
"	...	...	" 11-8	"	...	...	...	...	...	4	...	...
"	...	...	" 11	"	...	...	...	...	...	1	...	...
"	...	...	" 9	"	...	...	...	...	22	...	...	...
"	...	...	" 6	"	...	...	...	...	13	...	...	...
Cook	...	...	" 17	"	...	...	...	...	...	1	...	...
"	...	...	" 12	"	...	...	...	...	...	2	...	...
Dhobi	...	...	" 20	"	...	...	...	...	...	1	...	...
"	...	...	" 12	"	...	...	...	...	...	1	...	...
"	...	...	" 10	"	...	...	...	...	...	1	...	...
Grave-digger	...	...	" 10	"	...	...	...	...	6	...	...	...
Hamal	...	...	" 10	"	...	...	...	...	...	...	...	1
Laboratory boy	...	...	" 12	"	...	...	...	...	...	...	...	1
" (allowance)	...	...	" 10	"	1	...	...	...	...	...	...	...
Peons	...	...	" 10	"	...	...	...	...	...	...	...	...
"	...	...	" 9	"	2	...	...	...	...	...	...	...
"	...	...	" 8	"	...	...	...	...	...	...	...	...
"	...	...	" 7	"	...	...	...	...	...	...	...	...
" boy	...	...	" 3	"	...	...	...	...	...	...	...	...
Police Ramosis	...	...	" 11-4	"	...	...	...	...	...	4	...	...
Syces	...	...	" 10	"	...	...	...	...	...	...	...	7
Halalcores	...	...	" 14	"	...	...	...	...	...	25	...	...
"	...	...	" 11-8	"	...	9	3	7	51	...	1	...
Sweepers	...	...	" 11	"	...	...	...	...	...	...	...	...
Total ...					17	9	5	8	93	112	1	13

B—contd.Departments during the Fourth Epidemic—*contd.*

Chief Accountant's Department, including Stores Branch	House Inspection Staff.	Drainage Department Staff.	Commissioner's Office Staff.	Camps & Hospitals, excluding Arthur Road and Bandora Hospitals.	Total Number.	Total amount per month.			NAMES.
						Rs.	a.	p.	
16	32	1	13	...	71	6,723	0	0	
...	1	1	20	0	0	
...	4	580	0	0	Misses Winscome, Goodall, Yates and Baker.
...	1	30	0	0	
...	4	60	0	0	
...	1	25	0	0	
...	13	195	0	0	
...	38	456	0	0	
...	...	2	...	...	2	60	0	0	
...	...	1	...	...	1	30	0	0	
...	...	1	...	...	1	22	8	0	
...	...	16	...	...	16	210	0	0	
...	...	30	...	...	30	281	4	0	
...	27	...	...	...	27	270	0	0	
...	2	2	20	0	0	
...	1	15	0	0	
...	1	15	0	0	
...	2	24	0	0	
...	4	46	0	0	
...	1	11	0	0	
...	22	198	0	0	
...	13	78	0	0	
...	1	17	0	0	
...	2	24	0	0	
...	1	20	0	0	
...	1	12	0	0	
...	1	10	0	0	
...	6	60	0	0	
...	1	10	0	0	
...	1	12	0	0	
...	1	10	0	0	
1	1	...	2	20	0	0	
1	3	...	6	54	0	0	
1	1	8	0	0	
...	4	...	4	28	0	0	
1	1	3	0	0	
...	4	45	0	0	
...	7	70	0	0	
...	25	350	0	0	
...	1	72	828	0	0	
...	2	2	22	0	0	
20	59	51	21	6	415	10,972	12	0	

Among the whole staff 20 cases of Plague were reported during the year as follows :—

Medical Officer (Dr. J. B. de Quadros)	...	...	...	1
Sub-Inspectors	...	...	...	2
Kettle-boy	...	...	...	1
Coolies	...	...	...	16

One of the Sub-Inspectors, the Kettle boy, and 3 of the coolies recovered, the other cases terminated fatally. Most of the staff were inoculated. Inspectors Murfoy, Alexander and Demmi, all tried and loyal servants, died of causes other than Plague during the year.

The District Officers, almost without exception, speak in the highest terms of the superior staff working under their orders, and there was hardly a man among the sectional Medical Officers who did not spend himself ungrudgingly when the epidemic was severe. The Inspectors and Sub-Inspectors on the whole worked loyally and well—though in taking on extra hands when Plague increased, a considerable number of the new men tried had to be dispensed with after a very brief probation. A special word of praise is due to Mr. J. Clarke of the Health Department who worked as a contact inspector in C. Ward and carried out his duties with very marked tact and success. The clerical staff worked specially well in C. Ward, D. Ward, E. Ward, West, F. and G. Wards, and the Central District. One Sub-Inspector and 5 or 6 mucadums, ramosis, &c., were dismissed for taking bribes during the year, but on the whole few complaints were made. It may be mentioned that one outsider was caught personating a Plague official and extorting money. He was convicted and sentenced to 4 months' imprisonment.

During the year there was a very severe epidemic of small-pox and at the end of the year cholera appeared. In connection with these diseases the District Officers and staff were called upon to undertake all disinfection work, and in the case of small-pox the removal of the sick as well. These calls, involving additional work, and additional risk, were responded to with alacrity by all, and the hearty loyalty of every one went far to minimise the difficulties of administration.

Expenditure.

The following statement shows the expenditure on Plague operations from 1st June 1899 to 31st May 1900.

	Expenditure incurred by the Municipality.	Payments made on account of charges incurred by the Municipality during the existence of the Plague Committee.	Payments made and receipts realized against charges incurred by the Plague Committee.	Total.
<i>Establishment.</i>	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.
Central Offices, Superior	3,210 0 0	.....	960 0 0	4,170 0 0
Do. Subordinate	19,365 12 7	.....	.....	19,365 12 7
District Offices, Superior	96,696 1 8	.....	.....	96,696 1 8
Do. Subordinate	55,714 0 8	.....	.....	55,714 0 8
Hospitals, Superior	13,719 14 5	.....	.....	13,719 14 5
Do. Subordinate	38,173 1 1	.....	.....	38,173 1 1
Military, Naval, and Police Subordinates	7,616 3 0	.....	.....	7,616 3 0
Labourers, Halalcores, Scavengers	68,640 15 8	.....	27 8 7	68,668 8 3
Tile Turners	1,112 8 4	.....	.....	1,112 8 4
Death Registration Ramosis	26,841 5 6	.....	.....	26,841 5 6
	3,31,089 14 11	.....	987 8 7	3,32,077 7 6

	Expenditure incurred by the Municipality.	Payments made on account of charges incurred by the Municipality during the existence of the Plague Committee.	Payments made and receipts realized against charges incurred by the Plague Committee.	Total.
	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.
Establishment recoverable from				
Government	45 0 0	.....	.....	45 0 0
Contingencies	56,044 12 6	Cr. 30 0 0	25 15 9a	56,040 12 3
Inoculation Expenses	36,688 14 0	.....	.....	36,688 14 0
Inoculation fees to Doctors and others.	12,393 7 10	.....	.....	12,393 7 10
Food supply Hospitals	32,943 15 9	.....	.....	32,943 15 9
Do. Observation Camps	3 15 8	.....	.....	3 15 8
Police Plague Expenses... ..	15,040 12 10	.....	.....	15,040 12 10
Lime	2,581 11 4	.....	.....	2,581 11 4
Clothing	10,947 4 4	.....	.....	10,947 4 4
Uniforms to Death Registration, Ramosis... ..	3,280 5 4	.....	.....	3,280 5 4
Compensation for clothing, &c., destroyed	51 6 0	.....	.....	51 6 0
Compensation huts, sheds, &c., destroyed	2,047 0 0	.....	.....	2,047 0 0
Medicines, Medical instruments and appliances	31,449 3 1	.....	.....	31,449 3 1
Construction, District Offices and sheds	6,902 8 7	.....	.....	6,902 8 7
Do. Latrines and Urinals	4 15 9	.....	.....	4 15 9
Do. Hospitals	5,638 10 6	.....	.....	5,638 10 6
Do. Segregation Camps	3,184 11 5	.....	1,216 6 2	4,401 1 7
Do. Observation Camps ... ..	.....	.....	Cr1,530 2 2	Cr1,590 2 2b
Observation Camps, excluding charges for food and construction ... ..	.....	.....	Cr1,639 3 11	Cr1,669 3 11c
Rent of ground, godowns and quarters.	28,053 0 7	.....	1,335 11 7	29,388 12 2
Railway Inspection	Cr. 20 0 0	.....	Cr. 200 0 0	Cr. 220 0 0c
Road Inspection	Cr. 20 0 0	.....	Cr. 200 0 0	Cr. 220 0 0c
Sea Inspection	59 5 6	.....	Cr. 350 0 0	Cr. 300 10 6c
Law charges	800 0 0	.....	.....	800 0 0
Stores, firewood for cremation of dead bodies, &c.	15,802 9 8	.....	.....	15,802 9 8
Lime-washing, labour and stores, excluding lime	18,859 14 0	.....	.....	18,859 14 0
Arthur Road Hospital	72,293 10 4	.....	.....	72,293 10 4
Cleaning and flushing drains, &c., including extra allowance to the Fire Brigade Staff, purchase of hose, coal, &c.	16,075 14 4	.....	.....	16,075 14 4
Pulling down and burning condemned houses	2,902 4 4	.....	.....	2,902 4 4
Inspection of houses in different parts of the city	34,639 1 4	.....	.....	34,639 1 4
Cost of Professor Lustig's serum obtained from Italy ... ..	.....	39 0 0	.....	39 0 0
Cost of preparing Professor Lustig's curative serum in Bombay including salary of Drs. Gallioti and Polverini	18,610 14 6	.....	.....	18,610 14 6
Maratha Hospital and Camps	237 15 7	.....	.....	237 15 7
Purchase of Furniture	3,520 0 7	.....	Cr1,171 10 11d	3,348 5 8
Disinfectants	50,921 10 9	.....	.....	50,921 10 9
Assessment Taxes	735 7 9	.....	.....	735 7 9
Telephone connections	3,112 4 0	.....	.....	3,112 4 0
Cutting off service pipes, erecting stand pipes, &c.	2,121 4 2	55 13 11	.....	2,177 2 1
Working Expenses of the electroliser...	575 1 8	.....	.....	575 1 8
Compassionate allowanees	3,200 0 0	.....	.....	3,200 0 0
Repairs and maintenance, &c., of camps and hospitals	14,014 9 1	.....	.....	14,014 9 1
Honorarium or rewards	925 0 0	.....	.....	925 0 0
Washing ambulance carriages	3,012 12 6	.....	.....	3,012 12 6
Rs. ...	8,40,771 6 6	64 13 11	Cr1,625 6 11	8,39,210 13 6
Less—Miscellaneous Receipts	3,284 2 6	.....	.....	3,284 2 6
Miscellaneous Fines and Penalties	415 7 5	.....	.....	415 7 5
Recoveries from Government.	3,323 12 0	.....	.....	3,323 12 0
Rs. ...	7,023 5 11	.....	.....	7,023 5 11
Total Rs. ...	8,33,748 0 7	64 13 11	Cr1,625 6 11	8,32,187 7 7

(a) Sale proceeds of copies of Mr. Snow's Plague Report.

(b) Adjustment of value of bamboos got for camps at Dadar and Matoonga.

(c) Write back of claims against Government subsequently waived.

(d) Sale proceeds of articles of furniture, shed materials, &c.

CHAPTER IX.

Miscellaneous.

Attitude of the people.

In a few instances the plague staff met with actual opposition. Some of the most serious cases are mentioned below :—

On Christmas eve the Assistant District Officer and staff had to remove a Mangeli living at Mahim, suffering from plague, to hospital. When they reached the house they found a crowd of Mangelis collected in a threatening attitude and they saw it would be impossible to carry out the removal without a disturbance. The case was removed without any difficulty with the assistance of the police on Christmas morning.

On another Sunday the Deputy Commissioner received information that a pensioned police Jemadar, living on a flat, the residents of which had been required to go to camp as evicts unless they preferred inoculation, had secured the arrest of a plague inspector by the police on a charge of wrongfully confining his wife.

The Deputy Commissioner went to the place and personally sent the complainant and his wife—who had not up to then been removed—to camp, not without some difficulty. Enquiry showed that while a number of the people were undergoing inoculation, the complainant slipped away. The Sectional Medical Officer then ordered a municipal lock to be put on the door of the room, which was already locked by the owner and left a ramosi on the ground floor with instructions to come and tell him when the man came back, so that the door might be opened and the man sent to camp or inoculated.

The retired Jemadar then complained to the police that his wife had been unlawfully confined in the room, and when the police came upon the scene she undoubtedly was in the room, whether he had locked her up there himself or subsequently smuggled her in through a window was not apparent, but it was perfectly clear, as was eventually decided by the Magistrate, that the charge that the plague staff had deliberately locked the woman up in order to compel her to undergo inoculation was utterly baseless and unfounded.

The Sectional Medical Officer, Colaba, was twice assaulted in the most unprovoked manner in the discharge of his duties. The assailants were in both cases convicted and sent to gaol.

At one time in Dongri, stones were thrown at the plague staff; on another occasion some contacts absolutely refused to go to camp or to be inoculated, and had eventually to be sent to camp in charge of a couple of policemen, after which they promptly came back and had themselves inoculated. In the same district when the District Officer was going round with one of his volunteers, some contacts who had absconded the day before were found, and when told they must go to

camp, assaulted the volunteer. These were convicted and sentenced. On more than one occasion registration ramosis, cemetery messengers and other members of the staff were threatened or assaulted, and not infrequently serious difficulties were averted by the influence, tact and firmness of volunteers.

A few heavy claims for damages or bitter complaints about disinfection were made; and these were always most carefully enquired into, and if it was found that any damage had been done, compensation was awarded. Disinfection must almost always cause great inconvenience, but the complaints and the claims were generally found to be grossly exaggerated and diminished on enquiry to very petty dimensions.

It might be thought from the above that the attitude of the people was violently opposed to plague measures; but it should be remembered that these instances of opposition extended over a population of 700,000 and a period of a year, and it may be safely said that the general attitude of the people towards the plague staff was fairly friendly during the year. Their belief in plague measures was no greater than before, and, but for the pressure of various kinds that was brought to bear, very few plague cases would have been reported. The staff had often to get through a great deal of talking and persuasion in order to accomplish their work, but eventually the people almost always passively acquiesced. Capt. Boileau writes rather more hopefully than others on the subject, and the following is taken from his report:—

“On the whole, the attitude of the people towards plague measures has in this Ward been favourable and there is no doubt that many people who were against these measures last year have, in the year under observation, completely changed their views. Evacuation has been carried on to an enormous extent in this Ward, and a rough estimate of the numbers in camp, in the whole of my District including the large camps in the fields between Dadar and Sion, would place the figures at about 60,000 souls. Many of these were in camp from December and the camps this year lasted till the middle of May; so that the people may be said to have left their houses for half the year. Had it not been for this precaution on their part, I believe the mortality would have been terrible, as wherever people were obstinate and would not go to camp, plague most surely visited them. The landlords have, as in former years, still been the cause of retaining many people in their homes, who would in other cases have left, and these were chiefly people who owed a good deal of rent. I have always endeavoured to find out such people and assist them as much as possible.

“There can be no doubt that a vast amount of plague is still concealed, but it seems impossible to trace it. Last epidemic there were only 4 cases of plague reported from the camps. This year Mr. Harvey and his staff of 6 Registration Ramosis reported no less than 168 cases, and also gives it as his opinion that, without doubt, many escaped observation. Many people were brought into the camps by the last trains from Bombay, but although I had Ramosis on watch I was unable to stop many of them. In Dharavi I discovered 4 cases hidden under old hides—a very unpleasant task.

“Inoculation has brought with it much good and amongst those who have been done the old fear of the plague seems in a great measure to have died out. There is still room for much more work in this direction, and I am confident that

next year many more people will be found ready to accept this preventive measure and in the year under report many contacts accepted inoculation in preference to Segregation Camp. There is still a great deal of dread of being sent to hospital and the sight of an ambulance is always most disquieting."

The following table shows the number of roadside cases and deaths found by the District Officers—except C. Ward and F. and G. Wards—during the course of the year. The comparatively large numbers in A. Ward, are due to the fact that so many of the homeless and destitute wanderers from Kathiawar made the maidans of the Esplanade their lodging, and that more of them did not succumb to plague is due to the fact that so many were inoculated. The District Officer, Central District, points out that the number of roadside Mussalman cases in his district, was considerably greater than that of Hindus, and argues that this was due to the fact that the Mussalmans as a body would not take to inoculation: it must however be remembered that the population of his district is mainly Mahomedan. The greater portion of these cases occurred among beggars and homeless people, but some were people who had tried to go on with their daily work in spite of sickness and were suddenly struck down by the way, others were actually on their way to hospital and some were undoubtedly turned out when they fell sick either by their neighbours or their rent collectors, to avoid plague measures.

Roadside removals and deaths from plague and other causes.

District.	Plague.	Other causes.
A. Ward	260	210
B. „ North	146	33
B. „ South	62	82
C.	...	...
D.	98	72
E. West	111	30
Byculla	82	51
Wari Bundar	32	22
F. and G.	...	...
Central	201	173

Plague at the
Bandra
Slaughter-
Houses.

Cases of Plague began to occur at the Bandora Slaughter-houses in July 1899—and as of the population of this compound (some 700) about 550 are Mussalmans, the control of operations there was placed in the hands of the D. O. Central District, who has a large Mussalman population to deal with. Dead rats were found at various times and rigorous disinfection was invariably undertaken. The type of the disease was very virulent and out of 25 cases only 3 recovered: the people did their best to conceal cases of sickness and a sub-inspector had to be maintained for the special purpose of reporting any illness among them. At first a number of rooms at the end of one of the chawls were reserved as hospital accommodation; as a means of isolation this was ineffective, and as the people strongly objected to even this modified form of removal they were eventually allowed to remain in their rooms on the understanding that all the nearest 6 rooms were entirely vacated.

Two of the chawls were at one time completely evacuated. The butchers are an exceedingly difficult class, and strongly resented any interference of any kind. At one time they threatened to strike, but were pacified by Khan Bahadur Abdul Razzak bin Curtas. Indeed to this gentleman belongs most of the credit of having got through the year without serious trouble at the Slaughter-houses. Messrs. Mahomed Kasum, Ali Khan, and Shahbuddin Shah must also be mentioned. They were appointed as volunteers and their influence and advice was most valuable. The brunt of the work fell upon Khan Saheb Fazl Ahmed, the Sectional Medical Officer of Umerkhari; it was a serious additional burden to his already onerous duties, but he undertook it ungrudgingly and carried it out conscientiously and with tact and success.

APPENDIX A.

The history of some badly infected buildings.

By Dr. Bardi.

(1). 80-82, III. *Bhoiwada*,—Bhuleshwar. This is a very large chawl, four-storeyed, with more than 35 rooms on each floor. It is very well ventilated, and was free from any infection during the previous epidemics except for a solitary case in 1898 and one in 1899—both of which were imported from other parts of the town. The first case during the present epidemic occurred on 12th February 1900, when two plague cases were sent to hospital. These cases were on the first floor and usual action was taken. About ten families only remained on the 1st floor, the others vacating it for health camps in the suburbs. One of these two cases came from B Ward. Seven more cases occurred in the same house. Five on the 1st floor, one on the 2nd floor, and one on the 3rd floor, during the same month, *i. e.*, within 16 days. The whole floor was then vacated and disinfected. One case occurred in April 1900 on the fourth floor and the house has been practically free since then. It is curious that all the cases sent to hospital from 1st floor died there, whereas those from 2nd and 3rd floor recovered in the hospitals.

(2). *House No. 2, Panchayet Wadi*.—This is also a large chawl divided into three blocks. The block behind the Bhuleshwar Library was infected during the previous epidemics. This year plague cases, three in number, occurred in the same rooms that were infected last year, the first case was on 21st February 1900, and the third on 25th February 1900. The tenants vacated the chawl and went to Dadar and Matunga. The whole block was disinfected, and there have been no cases there since then.

(3). *House No. 7, Kallindas Kirparani's Chawl*,—Bhuleshwar. This is a large 4 storeyed house with 20 rooms on each floor. Four cases occurred in this house during the last epidemic when it was disinfected and shut up for a month. This year the epidemic commenced in this house in March and the first case occurred on 22nd March 1900. Usual action was taken but two more cases occurred, one on 31st March 1900, and the other on 2nd April 1900. The people then left the house for health camps and the place was disinfected. No fresh cases have occurred in the house since then. This is also a fairly well-ventilated house.

By Dr. Britto.

(1) *Antoba Wadi, No. 21*.—This is a double row of chawls of wattle and daub construction. The rooms are small and dark, having no other means of ventilation, except the doors. It is tenanted by Mahrattas. There is considerable overcrowding in the rooms. The 1st case occurred on 2nd January 1900. The whole chawl was vacated, as dead rats were found. After the lapse of ten days, the room were allowed to be re-occupied. On the 27th February again one case of plague was

detected. In this instance the contacts were removed to camp. No cases of plague were detected until the 3rd March, when two deaths from plague occurred in the same room. At the same time, another case was found suffering in the chawl and removed to hospital, while two others were removed voluntarily to hospital by friends. The chawl was vacated for a second time and kept closed for two months.

(2) *Muhajan Wadi, No. 4.*—This is a long chawl recently improved and rendered sanitary with better ventilation. The 1st case was observed on the 14th January 1900 and the 2nd on the 19th of the same month. The contacts from the rooms were removed to camp and the rooms disinfected. Another case of plague occurred on the 28th February. The whole chawl was vacated and kept closed for a month. Two cases occurred in April after re-occupation of chawl.

(3) *Moombadevi, Nos. 115-119.*—This is a well ventilated chawl inhabited by the better class of Hindoos, *viz.*, the Jains. The 1st case of plague occurred on the 3rd October 1899. No history of dead rats was at the time discovered. This was followed by a second case on the 14th *idem*. In consequence of this the whole chawl was examined for dead rats and a large number of them were found in different floors. The whole house was vacated and disinfected and kept closed for 20 days. No cases of plague were observed until the 15th November 1899 and another as late as 29th April 1900.

(4) *Moombadevi Temple Compound, No. 8, Sub. No. 3.*—This is a very insanitary house built of boards. The rooms are dark, small and ill-ventilated. It is inhabited by Jains, Brahmins, and other Hindoos. Three cases of plague were detected on the 13th January 1900. The house was in consequence vacated and closed for a month. No cases of plague occurred after this.

(5) *New Hanooman Lane, No. 185-187, Sub. No. 1.*—This is a one-storey chawl, the 1st floor of which is occupied by Mahrattas of the labouring class. There is considerable overcrowding in the house. The rooms are dark and ill-ventilated. The 1st case occurred on the 5th October 1899. All the people with few exceptions were inoculated and the house disinfected. No case of plague occurred until December 1899, when one case occurred on the 29th and the other on the 30th. The contacts were removed from the room in which the cases occurred to camp. On the 1st January 1900, another case was detected in the next room, which was disinfected and the contacts were inoculated. Another case occurred on the 23rd January when it was thought advisable to vacate the house. The whole house was disinfected and closed for one month. No further cases occurred after re-occupation.

(6) *New Hanooman Lane, No. 86, Sub. No. 9.*—This is a long range of chawls with back-to-back rooms. The rooms are small, dark, and ill-ventilated. It is inhabited by Mahrattas and Karwas. There is considerable over-crowding in this chawl. During the previous epidemic, this house was vacated twice and kept closed for varying periods. Three cases were detected on the 2nd June 1899, which was followed by another on the 8th *idem*. The case rooms, side and back rooms, were vacated and disinfected. No cases of plague occurred until September 1899, when two cases were detected on the 1st. The whole chawl was vacated and closed for 15 days. A number of people after returning from camp, submitted themselves to inoculation. There were no cases until 2nd January 1900, when two cases were detected. The contacts were inoculated and the rooms were disinfected. Another case was observed on the 10th of the same month and the case room and side and back rooms were vacated. Two cases of plague were detected in March; the case room and side and back rooms were vacated.

By Dr. Gimi.

(1) *Tara Naikin Wadi, No. 9.*—About the middle of September it was brought to my notice that rats were dying about the Wadi and on or about 28th September 1899 the first plague case occurred in the chawl. It was sent to hospital where he succumbed next day. The room was vacated and the house disinfected. No case occurred in the chawl until 12th October 1899. After that date inoculation was pushed to a great extent in that chawl. Deaths (plague) did not occur in that chawl until 18th January 1900, except one which occurred on 21st October 1899. In February and later, several cases occurred in the chawl, but all the cases were among the non-inoculated. In every case, the room was disinfected and the contacts which were not inoculated and which did not take inoculation later were sent to segregation camps.

(2) *Charnivadi No. 87.*—This is one of the houses where there was very little plague last year. The first case of plague occurred on 29th October 1899, the room was vacated, the contacts segregated and the room as well as one room on each side were disinfected. No case of plague occurred in that house until 27th January 1900, when the first case again appeared after two months. On inquiry, I learnt that rats were dying about the house for the last fortnight. In the first and second week of February several cases of plague occurred, when the house was completely vacated and thoroughly disinfected. The house was re-occupied after a fortnight on 5th March 1900. Since then only one case occurred in the house on 12th May 1900.

By Capt. Dun-
bar Stuart.

(1) *Jairajbhai's Chawl in Forjett Street off the Tardeo Road* consists of 4 blocks, single storey—3 parallel to one another, and the other at right angles to the three; at the back of the latter block is a buffalo stable. The compound is a large and airy place having good open ground; the blocks do not adjoin one another, a distance of 25 feet separates them from one another. There are in each block 48 rooms, 24 a side; mud floor with 18" plinth; the partitions, planks. The whole of this place was badly infected last year: up to 31st May 1899, there were 36 cases and deaths. All the blocks were evacuated one after another. The block I specially write about is the one in front of the stables. This block, on account of a number of cases last February 1899, was vacated on the 27th March; the Fire Engine was requisitioned, and the place absolutely flooded, roofs, walls too, with phenyle solution; it took 4 hours to do. The place was allowed to dry thoroughly. One wash of thin Perchloride was used, the place thoroughly cleaned, white-washed, tiles to the width of 2 ft. removed over each room. The place was then re-occupied on 1st June 1899, the Chowpaty Camp being closed. The place kept well, and no plague case occurred till August, when there were 2 suspicious plague cases, viz., one on 6th August 1899, and the other on 19th of the same month; it then kept free till 22nd November 1899 when there was again a suspicious death. Nothing more happened till the beginning of the year, when for a period of 3 months there were 7* cases and deaths; the place was again vacated on 13th April 1900, and allowed to be re-occupied on the 25th May 1900. Since then there has been no death. This year in this compound there were only 21 deaths of which this chawl (the above described) contributed 10. Nothing will improve this chawl; utter evacuation for one year might do it; it breaks out in the season, the bacilli come to life again and attack the people.

(2) *In No. 121, Kandewady.*—There were 19 Plague cases and deaths between the 1st June 1899 and 11th February 1900. On the 11th February 1900, 2 blocks in the premises were completely evacuated; the people were removed to camp after the place had been thoroughly disinfected and flushed; it was allowed to be re-occupied on the 17th March. There was one death after re-occupation which was taken as suspicious, as there was no reliable cause of death, otherwise the place was kept free.

* One on 7th, one on 27th and one on 31st January; one on 25th and one on 26th February and one on 3rd and one on 31st March 1900, respectively.

(3) *In Ambawady, No. 699, Girgaum Back Road.*—There were only 4 cases and deaths between 5th April 1899, and 27th February 1900. Last year on account of 23 cases and deaths it was evacuated on 3rd March 1899, and re-occupied after good flushing and disinfection on the 5th April 1899. To take the necessary precautions this year they were persuaded to leave, or get themselves inoculated; the latter they refused, but did the former; all went into their camps. The place was carefully done and kept shut to them till 27th April 1900—when they were allowed to occupy it. Result—No plague, kept free.

By Capt.
Wooldridge.

(1) *House No. 39, Haines Road.*—This is a small house, a ground floor and a loft accommodating about 80 persons.

The first case, imported by a basket cooly from Dongri in B Ward, occurred on the 29th June 1899. Six contacts were removed within the next six days and they all died. It was evacuated on the 7th July and disinfected. The landlady applied quick lime and re-occupied it after one month; only one case occurred since, eleven months after, in the loft, *i.e.*, on the 5th May 1900.

(2) *No. 302, Haines Road, Jacob Circle.*—A very well built house, with three storeys. Open on all sides, good light and ventilation. A case was imported from 14th Lane, Kamatipoora, on the 5th January and died on 7th January 1900. Cases continued until 7 were numbered by the 31st March. The usual disinfection was done. In April 19 cases occurred and during this month inoculation and segregation was carried out. Still cases continued amongst the sub-tenants and tenants who returned from camp during the day, so in May the landlord came down and the chawl was at once cleared of all sub-tenants and others who owned too many in one family, and evacuation and disinfection was done by floors beginning with the top; after thorough disinfection quick-lime was applied and no cases have occurred since. The landlord, Mr. Govindji Lalji Dewsi, gave me the utmost assistance.

(3) *No. 257, Arthur Road.*—This is a two-storeyed chawl, well built and occupied by Goanese on the upper floor, and Marathas and grain sellers below. A case was imported from Agripada in January and was discovered on the 1st February. There were eight cases during the month and all these were in the same corner, so the whole lot of rooms were disinfected again and quick-lime washed and no more cases occurred in that part again. There was one plague case in another part of the chawl on the 27th April and that is all.

(4) *No. 52-60, DeLisle Road.*—A row of eleven rooms with each a small loft standing on a good plinth. On the 21st February there was one death and 8 removals.

It was evacuated and disinfected on the same day and not re-occupied for one month and it was quick-lime washed before re-occupation. No other cases have occurred.

(5) *No. 240, Haines Road.*—There are five buildings. The front four-storied house is well built, the north row of low rooms is bad and inside there is a large open space with two rows of low buildings to the west and south side; the fifth building being a two-storied building in the north-east corner. Plague broke out in the low rooms to the south and west sides chiefly occupied by Dhobis. The first case was on the 2nd August 1899; all the buildings were attacked except the two-storied chawl mentioned as the 5th building. Strange to say though there were 46 cases up to April, most of which were in the two rows of rooms to the south and west, this building remained free with the exception of the Bhaya, a pardesi, who mixed with all collecting rent. General inoculation was done and there have been no cases since the 23rd April.

By Dr. Munshi.

(1) *House No. 184, Chimna Butcher Street in Khara Talao Section.*—It is a four-storied house, occupied by Dakni Mohamedans. The ground floor has 4 rooms absolutely dark, damp, dirty and without means of sufficient light and air. The floor is entirely *kucha* and out of order. The 1st, 2nd, 3rd and 4th floors are also ill-ventilated and their rooms are all made of wooden partitions, the floors imperfectly cemented. On the 25th of February 1900, there occurred a plague case on the 2nd floor, the infected room and 2 adjoining rooms were thoroughly disinfected and closed for 10 days. 2nd case occurred on the 26th of the same month and the same procedure of evacuation and disinfection was carried out. 3rd case occurred on the 27th of the same month, 4th case was discovered on the 3rd of March 1900, 5th case was detected on the 7th of the same month. All the preventive measures were used in the above cases as usual. The whole house was entirely evacuated on the 7th of March 1900, disinfected and closed. It was re-occupied on the 30th of March 1900, and since there has been no plague case in this house.

(2) *House No. 15, Nizam Street in Bhuleshwar.*—It is a two-storied house occupied by Kokni Mohamedans. This house has one side gully. Ground floor has two big halls, the floor is stone paved ; but they are entirely dark and without proper means of light and ventilation. First floor has only one big hall, well cemented but imperfectly ventilated. Second floor has one hall and 3 rooms which are also ill-ventilated and made of wooden partition. On the 4th March 1900, there occurred a Plague case on the ground floor, the infected room was evacuated and thoroughly disinfected. The second and the third cases were discovered on the 5th of March 1900 on the 2nd floor, and the 4th case on the 6th of the same month on the same floor. Finding that the progress of the epidemic was very rapid, the whole house was entirely evacuated with great difficulty, immediately disinfected, cleaned and closed for a fortnight. The result was very successful as there has been no case of plague in this house since.

(3) *House No. 60, Nizam Street in Bhuleshwar.*—It is a four-storied house inhabited by Kokni and Dakni Mahomedans. There occurred 8 cases of plague in this house and the history stands thus :—On the 29th of August 1899 there occurred a plague case on the 2nd floor, the infected room and 2 adjoining rooms were immediately disinfected, and closed for 10 days as usual. After an interval of 4 months the 2nd case was discovered on the 4th floor, on the 27th December 1899. The same procedure of disinfection and evacuation was again resorted to.

3rd case occurred on	...	...	18th February 1900
4th " "	...	...	17th March 1900.
5th " "	...	...	23rd " "
6th " "	...	...	23rd " "
7th " "	...	...	31st " "
8th " "	...	...	31st " "

Seeing that the house was very badly infected all through and the disease made its progress rapidly, the whole house was entirely evacuated on 6th April 1900, thoroughly disinfected and closed for 10 days. The result was very successful as there has been no fresh case of plague since it has been re-occupied.

(4) *House No. 142, Erskine Road, Khara Talao.*—It is a four-storied big house occupied by Memons and Dakni Mohamedans. There occurred 8 cases of plague in this big house on the following dates :—

1st case of plague on	...	...	...	16th March 1900.
2nd " "	...	...	...	19th " "
3rd " "	...	...	...	24th April 1900.
4th " "	...	...	...	25th " "
5th " "	...	...	...	26th " "
6th " "	...	...	...	4th May 1900.
7th " "	...	...	...	7th " "
8th " "	...	...	...	9th " "

Finding that the house was infected all through, the whole house was entirely vacated on the 12th of May 1900, disinfected thoroughly twice and closed for 10 days.

After the re-occupation there has been no fresh case of plague since.

(5) *House No. 126, Erskine Road, Khara Talao.*—It is a single storied big chawl, occupied by Gujrati Mochis (Shoe-makers). The ground floor has 18 leather shops; the floor is stone-paved. First floor has 20 rooms, too small, and the floor is entirely *kucha*. The outside and inside walls of the rooms are all made of wooden planks. There occurred 6 cases of plague and 3 of suspicious fever in this big chawl on the following dates:—

1st case of plague on ...	...	...	25th July 1899.
2nd " ...	...	...	10th December 1899.
3rd " ...	...	...	1st January 1900.
4th " ...	...	...	23rd January 1900.
5th " ...	...	...	11th March 1900.
6th " ...	...	...	26th "
7th " ...	...	...	30th "
8th " ...	...	...	1st April 1900.

Finding that case after case was occurring in this chawl, the whole was entirely evacuated on the 1st of April 1900, and thoroughly disinfected twice and closed for 10 days. It was re-occupied on 22nd of the same month. There occurred 2 cases more in this chawl after re-occupation on the following dates* and after making deep and perfect enquiries, I learnt that these cases were imported from another District. The infected rooms were vacated, the contacts removed and the place disinfected thoroughly.

By Dr. Fazl
Ahmed.

(1) *House No. 234-236, Kambeker Street, Umarchadi.*—The house is an example of the sort of houses very suitable for the growth of the plague germs. The rooms on the ground floor were dark, having insufficient windows to let the sun and air in. They were overcrowded with inmates of very dirty habits, and dirt and rubbish was found lying everywhere. The floor was *katcha* and quite damp. Seeds require soil to grow upon and the seed of plague requires filth and darkness and damp whereon to grow and multiply. As all these circumstances, so favourable to the plague seeds to flourish upon, were present in the house there occurred a suspicious plague death in the house in November 1899. This was followed by another on the 24th of the same month, and 3rd on the 26th of January 1900. After this there passed a period of quiescence for about a month during which the germs remained in a dormant condition. However, on the 23rd February, they assumed a fearful activity and there occurred 5 suspicious deaths within a short period of three weeks; the house was searched thoroughly on the 16th March, and a plague case was detected; the house was evacuated there and then. The house belongs to an old widow of the Kuchi Memon community. A large crowd gathered at the door and asked to stop the evacuation, laughing at the measure and declaring it a fruitless uncalled-for oppression. However the evacuation was carried out and the inmates sent to-camp, the house was thoroughly disinfected, cleaned, white-washed and the inmates were brought back to live in. Not a single case occurred in the house since then, and not even a natural death. Some of the people that were present at the time of evacuation watched with a keen anxiety, waiting to see another case of plague occurring in the house, but I am afraid they might have to wait till the coming epidemic season.

If the sanitation of a house is good and it is accidentally infected by infection being brought to it from some dirty place, disinfection thoroughly and properly done is quite sufficient to make it free from plague. It is only in dark and dirty overcrowded dwellings that plague germs, when once brought in, establish themselves, it cannot be got rid of until starved to death by evacuating the house. Several instances have been noticed supporting this view.

* 26th of April, and 29th of May 1900.

APPENDIX B.

Miscellaneous Notes.

Notes by Capt.
Dunbar Stuart,
D. Ward.

Rats.

(1) *Miscellaneous notes.*—At No. 628, Girgaum Road, in an upper room on the 2nd floor, there lived one Gessu Naikin, age 25, female ; there are 3 other rooms on this floor and 4 rooms above. On the 5th January information was given, that there was a woman ill with fever. Dr. D'Avoine and myself went and saw her about 4 p.m. She had fever, but Dr. D'Avoine did not think it suspicious. We went to see her again on the 8th January, when he pronounced it to be plague. She was removed to Hospital at 4-30 p.m. that day and died on the 10th January. She was by herself, lying on the ground, though there was a bed. She was a prostitute by profession. Whilst disinfecting the room on the 9th, we found a dead rat most snugly coiled up in a lota in the cooking-room ; the rat had not been dead long, about two days. This, I think, must have no doubt been the cause as there has been no plague in the chawl or anywhere near it. One case followed on the 16th, about two houses off.

(2) On the 21st August 1899, one Jothiram Ratnaji, age 30, male Brahmin, was removed from No. 5, Keshaji Naik's Chawl, suffering from plague and sent to Bhoiwada Hospital, where he died on the 23rd. In an empty room, two rooms off from where the patient was ill, a dead rat was found ; had been dead about two days ; I saw it myself. This is a pure case of the rat having given it to the man. There had been no other plague case near him, but in a different chawl, about 50 yards, an imported case was removed on the 26th July.

(3) In 95, Kandewady, one Mahadu Vitall, Brahmin, age 40, died of plague on the 22nd January. A dead rat was found under his bedding on the 24th January about two days old.

Inoculation.

(1) There were 6 gardeners, of whom one was married, all living together, *i.e.*, 7 of them in a large garden of Mr. Paruck's, 181, Girgaum Back Road. One Devoo Vishram, age 30, male, was brought in, suffering of plague, an imported case ; he died on the 17th September 1899. The contacts, *i.e.*, the above 7 people, were given the option to be inoculated or go to camp ; they selected the former. The next day, 19th, when we went to inoculate, the girl could not be found, the husband made the excuse that she was a mill-hand, that he would bring her the next day ; never could get hold of her. On the 22nd September information was brought that the girl was ill. On examination she proved to have plague, removed to Maratha Hospital on 22nd September, died on 23rd. The husband stated he was exceedingly sorry that he did not get her done. It was his own fault, he got her out of our way.

(2) In a house in Harkness Road all the servants were inoculated, with the exception of the butler's wife, who succumbed to a very malignant type of plague.

An infected locality.

One Chagunbai Tattya, age 35, female, residing in No. 7 Kruwa Gully, Khetwadi 6th Cross Lane, came from Bandora on the 1st August, was attacked and died of plague on the 5th August ; next room to her was one Hari Zamala, age 40, male, was found locked up, died of plague. The next room to this one, was a child Vitto Babaji, 5 years, male, removed to Maharatta Hospital on the 4th, died on the 7th August ; in these very rooms, and in one opposite to them there were 8 deaths in December and January 1898-99 ; and the two relatives of these, who were sent to Grant Road Health Camp on the 6th, were sent to Maharatta Hospital at 8-30 p.m., 9th August, suffering from plague.

Notes by Dr.
Contractor.
Cases showing
the infectious
nature
of the disease.

1. In Kakadwadi No. 2, one Deoji M. Maratha, age 40, male, died of plague in one of the out-huts in the same compound, on the 8th November 1899. His widow and 2 children were subsequently inoculated and allowed to remain in the same compound after action being taken in the infected room : they kept well, not one of them attacked. On 11th November, Ramchandra Raghoji, Sonar,

age 25, was attacked with plague in one of the huts therein and went voluntarily to Modykhana Hospital, where he died the same day. On the 13th November, Yesobai, wife of Bhasker Rao Tarkhed, was down with plague and was removed to her father's house in Benham Hall Lane, No. 3, on the 14th, where she died on the 15th November. Same day (*i.e.*, on 13th) her brother-in-law Megasham was attacked and was removed to Modykhana Hospital on 15th, where he died on the 17th November. On the 14th, Josodabai, Meghashan's mother, was taken ill and began to show symptoms of a suspicious nature, developed plague on the 16th, but as she was too weak and nervous to be removed elsewhere she was segregated in her room; went eventually to Hospital on the 26th November. On the 2nd December 1899, one of the servants that was attending Megasham and Jasodabai, was attacked and removed to Modykhana Hospital, where he died on the 4th December. His name was Tasoo Karia, age 25, male, Maratha. All the above are of one high caste family. There was another suspicious death on the 12th January 1900, of one Mahadu Chintoo Kasar in the same premises. There was another plague death, Fatta Mulchund, age 25, male, Shimpri, in the same house on 10th January 1900. Besides these, there were 2 other removals, *viz*, (1) Rama Devji, age 20, male, Maratha, on 24th December and died in Maratha Hospital on 25th December, (2) Savlaram Bhao, age 33, male Maratha, removed on 4th January and died on 5th January 1900.

(2) *In Queen's Road, 303.*—A girl was brought from Byculla, on the 11th January suffering from plague, from a house, where there had already been a plague death, a day previous to her removal to the Queen's Road House. She died on the 13th January of plague. During the illness of the deceased, one of the domestic servants that had come from the infected house at Byculla and was attending the deceased, died a day previous to the girl's death, *i.e.*, on 12th January. Then on the 15th January 2 other servants of the same family died, in the same premises, of plague (one died in Hospital, same day of removal). Besides these plague cases there were 2 removals to Hospital on the 16th January, both died in Hospital.

By Lt. Brackenbury.

(1) In one week in August Lieut. Brackenbury brought the following 3 cases to notice :—

Infectious nature of the disease, especially pneumonic type.

- (i.) A man died under suspicious circumstances. Seven contacts were sent to camp and of these two developed plague (pneumonic).
- (ii.) A pneumonic plague patient was isolated, as he was too ill to be removed. A man living on another floor had been to see how the patient was getting on, and 3 days afterwards developed plague (pneumonic).
- (iii.) A woman was discovered on the third day of her illness to be suffering from plague, but was too ill to be removed. She died that same evening. The following day about 4 p.m. her husband developed plague.

(2) The week ending 12th March 1900 produced a further proof of the infectious character of pneumonic plague. One of a family of Banias (consisting of 3 brothers, a sister and the wife of one of the brothers) died of pneumonic plague. The case was seen about 3 hours before death by Dr. Sethna. After death 3 contacts (the others were not to be found at the time) were sent to their Mahajanwadi, where two days afterwards the sister developed pneumonic-plague, was sent to the hospital and died within 48 hours. This woman's son had escaped detection and had not gone to camp with his mother. He afterwards developed pneumonic plague, was concealed in another empty house in quite another part of the district where he also died.

**General
Remarks by
Capt. Lock.**

The measures adopted in this district have rung the changes on all the recognised principles for the prevention of plague. Every effort has been made to carry out these principles as thoroughly as possible and nothing has been more marked as a proof of the efficiency of such principles than that wherever and however from necessity such principles have been relaxed—there has always been a cause for regret in recognizing a sequence of cases following on an original case concealed. Inoculation was pushed as far as possible, and it is with regret I report that among Mahrattas, Bahroots, Mussalmans and Parsees very little progress was made. Unbelief and national phlegm on the part of these castes have proved weary trials to the enthusiastic worker.

To disinfection every importance has been attached and if non-recurrence of infection in rooms disinfected is proof, then disinfection has been of the most marked value.

Except in isolated instances no room, within an appreciable time, has been reinfected after disinfection. It has been noted that the same room will be reinfected during successive epidemics but there are only 2 or 3 instances I know in which a disinfected room has been reinfected during one and the same epidemic.

Evacuation and Quarantine.—If quarantine is not popular, evacuation of the infected room undoubtedly is. In the better classes the initiative will as often as not be taken by the occupants themselves. They often take a lot of persuasion to go to camps as required, but none to actually move out.

Among the poor and in a house badly infected evacuation has been carried out wholesale with the most marked results. As in the case of the Garrison Followers, Colaba, cases continued up to six days after removal to tents, but there it stopped and no further cases were heard of as long as they were under canvas. Evacuation is of all measures the most reliable.

ERRATA.

Page 377, eighteenth line, read : “ a *geometrical* progression ” instead of “ an arithmetical progression.”

Page 137 completes Part 1, the page numbers 138 to 146 being omitted.

PART II.

HOSPITALS

(Public and Private).

REPORT

ON THE

MUNICIPAL AND PRIVATE PLAGUE HOSPITALS

IN BOMBAY

Up to 31st May 1900.

Report on the Municipal and Private Plague Hospitals in Bombay up to 31st May 1900.

The following were the Municipal and private hospitals which were open for plague and other infectious diseases during the year :—

1. Arthur Road.
2. Modikhana.
3. Maratta, Connaught Road.
4. Julahi Sunni Mahomedan, Ripon Road.
5. Northbrook Gardens, Grant Road.
6. Parsee Hospital, Parel Road.
7. Aga Khan's Plague Hospital for Khojas.
8. Strong's Hospital, Colaba.
9. Port Trust, Frere Road.
10. Sarvajanic, Government House, Parel.
11. Adamji Pirbhoy, Charni Road.
12. Hindu Hospital, Charni Road Gardens.
13. Do. Maratta Portion.
14. Pathare Purbhoo.
15. Brahmo Ksatrya.
16. Kapol Bunyas.
17. Thakurdwar Lohanas.
18. Telegu, Kammateepura.
19. 3rd Bhoiwada.
20. Parel Jain.
21. Pinjrapol Jain.
22. Kokni Mahomedan.
23. Cutchi Lohana Hospital, Clive Road.
24. Bhattia Hospital, Modikhana.
25. Bene-Israel.
26. Islami, Nagdevi.
27. Petit Mills.
28. Maharaja Servants' Hospital, Bhuleshwar.
29. Kolsa Mohulla Mahomedan.
30. Narielwadi Mussalman.
31. Cutchi Dasa Oswal Plague Hospital.
32. Greaves, Cotton & Co.'s Plague Hospital.
33. Mahim Plague Hospital.
34. Marwari Futtehpura.

The following table gives the total number of cases admitted into the hospitals and the diseases :—

TABLE No. I.
Total admissions during the year.

Name of Hospital.	Plague.	Relapsing Fever.	Small-Pox.	Measles.	Chicken Pox.	Cholera.	Observa- tion.	Total.
Arthur Road Hospital	1,029	1,349	917	57	94	62	176	3,684
Maratta Hospital	2,513	263	595	13	28	...	1,310	4,722
Modikhana Hospital	1,107	118	...	...	...	...	830	2,055
Parsee Fever Hospital	140	...	5	...	...	...	10	155
Bene-Israel Hospital	62	...	...	...	...	...	18	80
Sunni Mahomedan Hospital	362	255	...	...	...	...	62	679
Parel Sarvajanic Hospital	310	9	...	...	...	...	29	348
Adamji Pirbhoy Hospital	114	...	...	...	...	...	17	131
Aga Khan's Koja Hospital... ..	115	...	...	...	...	...	19	134
General Mahomedan Hospital	504	6	...	...	...	...	237	748
Mahim Hospital	132	19	...	...	...	...	19	170
Port Trust Hospital... ..	58	...	...	...	...	...	30	88
Pathare Prabhu Hospital	19	...	...	...	...	...	1	20
Bhattia Hospital	59	1	1	...	...	...	2	63
Kapol Bunnyas' Hospital	54	2	...	...	...	...	5	61
Thakordwar Lohana Hospital	43	5	...	...	...	...	7	53
Greaves Cotton and Co.'s Hospital... ..	23	...	...	...	...	...	28	51
Jain Hospital, Parel	232	1	...	...	...	...	13	246
Dariasthan Lohana Hospital	288	1	...	...	...	...	19	308
Jain Catchi Dasa Oswal Hospital	13	...	...	...	...	...	1	14
Narielwadi Musulman Hospital	7	...	...	...	...	...	1	8
Kolsa Mohulla Hospital	4	...	...	...	...	...	...	4
Maharaja Servants' Hospital	9	...	...	...	...	...	2	11
Brahmo Kshatrya Hospital	42	...	...	...	...	...	...	43
Jain Pinjrapol Hospital	209	...	...	...	...	...	10	219
3rd Bhoiwada Hospital	156	...	...	...	...	...	2	158
Hindu Fever Hospital	388	10	...	...	...	...	68	466
„ Maratta Ward Hospital	191	4	...	...	...	...	37	232
Strong's Hospital, Colaba	203	...	...	...	...	...	37	240
Petit Mills Hospital ... ..	...	...	...	...	...	...	...	...
Telegu Hospital	202	3	...	...	...	...	23	228
Total	8,588	2,044	1,518	70	122	62	3,013	15,417

It will be seen from the above that the work done by the Municipal and private hospitals is very satisfactory. There were quite 1,000 more cases of all kinds admitted this year into the Hospitals. Some of the hospitals have not sent in returns, but these are chiefly the private Mahomedan ones and their admissions were very few.

The Arthur Road and Maratta Hospitals were asked to take on not only plague and relapsing cases, but, owing to the prevalence of other epidemic diseases, their wards were open to small-pox, cholera, chicken-pox and measles, all of which diseases were epidemic in the city. Fresh temporary wards were put up to meet the large number of cases which came in during the months of December, January, February and March when small-pox, chicken-pox and measles were epidemic; and the heavy nature of the work will be seen from the fact that in these two hospitals alone 1,512 cases of small-pox, 70 of measles and 122 of chicken-pox were admitted. Cholera began to be epidemic during April and May, and these cases were also admitted for treatment in the Arthur Road Hospital, and subsequently in the Maratta and Modikhana Hospitals.

The admissions for plague in the Arthur Road, Maratta and Modikhana Hospitals, or the three principal Municipal Hospitals, have been very much less this year as compared with last year; and the number of admissions from relapsing fever has also been less. The total number of admissions from all diseases have, however, been more this year in all these three hospitals by some 1,000 cases, owing no doubt to the number of infectious diseases which were epidemic during the year under consideration. I have thought it best to group these three principal Municipal hospitals together, as they give the fairest idea of work done, and I think

that amongst these Municipal hospitals the diagnosis can be relied on, whereas the same cannot be said of all of the other Municipal hospitals. The rest of the hospitals solely under the Municipality are the Sunni Julahi Hospital, the Mahomedan General Hospital, Northbrook Gardens, the Mahim Hospital, the Maratta Ward of the Hindu Hospital, and the Narielwadi Mussalman Hospital. The Julahi Hospital had a larger number of admissions during the present year, but the plague cases were fewer, the increase in the number of patients during the year is stated to be due to relapsing fever and observation cases. I cannot help stating that as a native hakim is in charge of this hospital, the figures for diagnostic purposes are unreliable. The Northbrook Gardens Hospital is also under the treatment and management of a native hakim. This hospital shows double the amount of admissions this year; plague cases are about 100 more, and the number of "observation" cases has risen from 32 last year to 237 this year. The Mahim Hospital was opened last June for the convenience of the people in F and G wards, and has proved a very useful institution, having treated some 170 cases during the year.

A small hospital, called the Narielwadi Mussalman, was opened by the Municipality at the Narielwadi village, and 8 cases were treated here.

Amongst the private hospitals the most useful were the Sarvajanic, the Parsee, Adamji Pirbhoy, the Dariasthan Lohana, Hindu, Aga Khan's, and Port Trust.

There has been a general falling off in the number of admissions in these hospitals. The new ones opened this year are the Maratta Wards of the Hindu Hospital, the Cutchi Dasa Oswal Bunyas, and the Maharajah Servants' Hospitals. Amongst the private Mahomedan hospitals only one has sent in any return, and I really cannot understand why the others, or in fact any of these hospitals, are kept open. They are hospitals only in name and are not of the slightest use.

My remarks regarding these private hospitals in the heart of the City hold good this as last year, and I am still more than ever firmly convinced that they are a sure source of danger to the community, and that all hospitals should be taken outside crowded localities in Bombay City and placed where they can have plenty of light and air and be under control.

I have little to add to the clinical features of the diseases this year. I would like to call attention to the remarks made by Dr. Choksy regarding the use of Haffkine's prophylactic serum, and further observations on this subject ought to be studied. We had some curious combinations of plague with other diseases, such as small-pox and relapsing fever, and these have been noticed by some of the medical officers.

Plague has been endemic during the year and cases were admitted every month; the epidemic began about December and continued during the following months up to end of April, when it began to decrease. Relapsing fever also began about the same time as plague and continued on to May. Several cases of this disease were admitted to the Arthur Road Hospital from the Oomercarry Jail, where the disease broke out badly. The virulence of plague was the same as last year, and the mortality kept to about 80 per cent.

Regarding the treatment of the disease, I think we can speak more hopefully this year. The experiments on Lustig's serum were continued at the Arthur Road Hospital and also at the Maratta and Modikhana Hospitals. This subject is fully entered into my Report on the serum, attached. I have tried to compile a full history of this treatment in continuation of last year's report.

In summing up the results of the effect of Lustig's serum, I am of opinion that it is of the greatest value as a curative agent if employed in the early stages of the disease. The injections if given in sufficient quantity, say, 100 ccs. the first day and again repeated on the second day, and in smaller quantities subsequently, is of great value in reducing the size of the glands and the infiltration around them, and consequently in reducing the pain from these inflamed glands. The secondary rise of temperature which is usual about the 3rd or 4th day is controlled if not prevented, and so the period of the disease cut short. Life is undoubtedly prolonged by the injections, and so valuable time gained. The serum is a valuable curative agent, but a great deal depends on the conditions in which the patient is situated. Every endeavour must be taken that the sanitary conditions of the room is as good as possible, and above all effective nursing is requisite to enable the patient to take advantage of every chance of recovery. The serum cannot be of very much use when the above requisites are neglected and patients, with hearts which we know are in the condition which this disease brings on, are allowed to get out of bed instead of never moving from the prone position.

I regret to have to add that I think the results obtained by the serum treatment at the Modikhana Hospital valueless. The question has been thoroughly gone into by myself, and I cannot help saying that, for all intents and purposes, the observations are useless, as they were carried on without any system. I think this is in a great measure due to the fact that the medical officer of the hospital had double duties to perform and could not give the time necessary for closer observation and care.

The nursing arrangements in the various hospitals have been intelligently and carefully carried out to meet the heavy demands in the Municipal and other hospitals. Thirty more English nurses were obtained from England. The nurses attached to the various hospitals earned the praise of all who have worked with them and they deserve every recognition. I have to thank Drs. Hunt and Taylor for the great help they have been to me and the medical officers of the hospitals; their reports are attached.

In conclusion I have to thank Dr. Choksey for his hearty interest in everything concerning the welfare of his hospital. His work in connection with the Lustig's serum is well known and no further comments are necessary. Drs. Dargalkar and Turkhud have also been hard working and managed their hospitals with success during a very trying year, and Sirdar Mir Abdulali as usual is the life of the Maratta Hospital which owes its prosperity to his unwearying support, and his interest in suffering humanity; also to Rao Bahadur Trimbuck Vaidya for his exertions on behalf of the Hindoo Hospital.

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Report on the Municipal Hospital for Infectious Diseases at Arthur Road from 1st June 1899 to 31st May 1900.

The Hospital is a permanent Municipal Institution and has been open since 1892.

The following staff was effective during March and April 1900 :—

Chief Medical Officer	1	Ayahs	13
Assistant Medical Officer	1	Cooks	7
Hospital Assistants	4	Dhobies	7
English Nurses	10	Mali	1
Local Nurses	8	Bhisti	1
Under Nurses	4	Dispensary Servant	1
Storekeeper	1	Ambulance Men	4
Clerk	1	Lime-Washers... ..	2
Compounders	2	Police Ramosees	6
Telephone Clerk	1	Coolie for Sterilizer	1
Driver of Sterilizer	1	Sweepers (Male)	31
Ward-Boys	80	Sweepers (Female)	14

The menial establishment numbered in all 173 : this was the largest number hitherto engaged, and was necessitated by the epidemics of small-pox, relapsing fever and plague.

It was considerably reduced on the subsidence of these epidemics.

The disposition and arrangements of the wards, etc., remained much the same as during the previous years. Two additional wards to accommodate 40 patients each were put up in the hospital compound for small-pox patients. The ten sheds of the contact camp outside the hospital compound were converted to hospital use and were utilised for small-pox patients also. The total accommodation of the hospital was thus enlarged to 580 beds,—340 for small-pox, 120 for relapsing fever, and 120 for plague. A steam sterilizer on Bowman's patent was put up and has worked satisfactorily. A semi-permanent store-room, 24' x 22', was also erected during the year.

No alterations were made in the latrines, or conservancy system. The method of disinfection of clothes, etc., by sweepers previous to washing by dhobies continued to be the same except for what is noted below.

Water-supply continued to be the same as in previous years.

No alterations were made in the system of disinfecting wards and other buildings.

All clothes, sheets, blankets, etc., were sterilized daily in the steam sterilizer previous to giving to dhobies for washing.

The disposal of the dead continued to be on the same principle as described in the last report.

Inoculation of Haffkine's Serum.—Twenty-two cases of plague that had been inoculated with Haffkine's prophylactic were admitted. Of these 9 died and 13 recovered, the mortality rate being 40·90 per cent. Eleven of these cases were treated with Lustig's serum, and an equal number were controls. Of the former 4 died and 7 recovered, whereas of the latter 5 died and 6 recovered.

The influence of Haffkine's prophylactic in favourably influencing the course of plague, and making it run a milder course, is no doubt undoubted in those cases where inoculations had been done some time previous to infection. The immunity conferred is very high during the first month after inoculation, and it gradually decreases week by week and month by month until a period is reached when the influence is practically *nil*. This is well illustrated by the course of plague cases coming in at varying periods after inoculation. In all those cases admitted within a month or two of inoculation, it is observed that the disease runs a much milder course, and mortality is also low. And as the interval between inoculation and infection becomes longer, the change for the better grows less and less, and is not so apparent and the mortality also goes higher. Such, however, does not seem to be the case, where inoculations had been performed within a week or so of the patients developing plague, in fact during the period of incubation. The disease in such cases is very unfavourably influenced; it assumes a graver if not a more fatal form and its normal course is unduly prolonged. This too has been well observed in some cases treated during the last epidemic. Clinical experience has in this case been corroborated by experiments also. Calmette in his recently published researches on plague in connection with the Oporto epidemic, refers to this unfavourable influence of prophylactic inoculations in animals already infected with plague germs and in process of incubation. He infected a certain number of mice with a culture whose virulence had been previously ascertained and which was known to kill only a small proportion of the animals. At the same time he inoculated all of them prophylactically with a small amount of a culture sterilized by 70° centigrade. The result was that instead of most of the animals recovering, they all died, showing how unfavourably the prophylactic had influenced them. In fact over and above the infection, they had received a fresh dose of toxins, which brought about the above results. This and similar other experiments have led Calmette to recommend the simultaneous injection of a curative serum and the prophylactic in those cases where it is apprehended that plague is incubating, and yet an *immediate* immunity is required. The curative serum would confer an *immediate* immunity and would neutralise any mischief already done, and the prophylactic inoculation would in the meantime produce those changes in the system which eventually confer immunity. By the time the effects of the former have disappeared, say from 10 to 15 days, the latter would assert its influence. It would be worth while making a few observations on these lines in the next epidemic.

I would however suggest that in such cases it would be preferable to inject the curative serum only to give *immediate* immunity as it is likely that a combination of the curative and prophylactic injections simultaneously would tend to neutralise the effects of each, and then the prophylactic about 10 to 15 days after. As the former creates no systematic disturbance, it would go a great way to allay the fear and excitement so inseparable from plague in the better classes of people, once a case has occurred in their family.

Sickness and mortality amongst the staff of the hospital :—

One ward-boy and one cook who were living on the premises contracted plague; they were admitted into the hospital and treated with Lustig's serum, and both recovered.

One ayah was infected with relapsing fever on two different occasions, and she recovered on both. She contracted the disease whilst in the discharge of her duties in the relapsing fever wards.

Ten sweepers also contracted relapsing fever whilst working in the relapsing fever wards: seven of them recovered, and three died.

TABLE I.

Total Admissions during the Year.

Months.		Plague.	Relap- sing Fever.	Cholera.	Small- pox.	Chic- ken- pox,	Meas- les.	Obser- vation cases includ- ing general diseases.	Total.	
June	1899	...	18	39	...	7	2	...	9	75
July	"	...	48	39	1	5	1	...	6	100
August	"	...	30	48	...	15	4	...	13	110
September	"	...	38	45	...	14	...	1	16	114
October	"	...	58	53	...	9	...	...	13	133
November	"	...	31	64	1	23	2	...	17	138
December	"	...	56	220	...	78	10	2	15	381
January	1900	...	120	191	...	276	42	20	38	687
February	"	...	176	103	1	267	20	20	17	604
March	"	...	230	139	2	123	8	10	10	522
April	"	...	160	235	14	60	5	2	18	494
May	"	...	64	173	43	40	...	2	4	326
Total		...	1,029	1,349	62	917	94	57	176	3,684

The largest number of admissions during the week ending 13th January 1900, when 217 patients were admitted.

The largest number of admissions on any day was on 9th January 1900, when 44 patients were admitted.

The total number of deaths during the year was 1,537.

The total number of deaths from Plague was 772.

The total weekly deaths were 80 in week ending 10th March 1900.

The percentage of deaths to admissions was 40·93 per cent.

The largest number of deaths during any day was on the 8th and 16th February 1900, when there occurred 16 deaths on each day.

TABLE II.

Diseases.				Admissions.	Deaths.	Recoveries.	Percentage of Mortality.
Plague	...	...	...	1,029	772	257	75·02
Relapsing Fever	...	...	...	1,349	413	936	30·61
Cholera	...	...	...	62	52	10	83·87
Small-pox	...	...	...	917	232	685	25·28
Chicken-pox	...	...	...	94	.....	94	.....
Measles	...	...	...	57	9	48	15·78
Observation and other diseases..				176	30	146	17·04
Total				3,684	1,508	2,176	40·93

TABLE III (A).—*Plague.*

Months.				Total admissions.	Died with- in 24 hours.	Died with- in 48 hours.	Total Deaths.	Total Recoveries.	Percentage of Deaths.
June	1899	...	...	18	7	3	15	3	83·33
July	,,	...	...	48	16	8	33	15	68·75
August	,,	...	...	30	9	6	22	8	73·33
September	,,	...	...	38	11	9	28	10	73·68
October	,,	...	...	58	21	20	48	10	82·75
November	,,	...	...	31	12	7	22	9	70·96
December	,,	...	...	56	12	15	42	14	75·00
January	1900	...	...	120	37	30	85	35	70·83
February	,,	...	...	176	62	36	137	39	77·84
March	,,	...	...	230	60	44	165	65	71·73
April	,,	...	...	160	46	34	124	36	76·87
May	,,	...	...	64	23	11	51	13	79·61
Total				1,029	316	223	772	257	75·02

TABLE III (B).—*Relapsing Fever.*

Months.				Total Admissions.	Total Deaths.	Total Recoveries.	Percentage of Deaths.
June	1899	...	...	39	9	30	23·07
July	,,	...	...	39	7	32	17·94
August	,,	...	...	48	13	35	27·08
September	,,	...	...	45	11	34	24·88
October	,,	...	...	58	12	41	22·64
November	,,	...	...	64	21	43	32·81
December	,,	...	...	220	65	155	29·54
January	1900	...	...	191	69	122	36·12
February	,,	...	...	103	45	58	43·68
March	,,	...	...	139	41	98	29·49
April	,,	...	...	235	56	179	23·82
May	,,	...	...	173	64	109	36·99
Total				1,349	413	936	30·61

TABLE III (C).—*Small-pox.*

Months.					Total Admissions.	Total Deaths.	Total Recoveries.	Percentage of Mortality.
June	1899	...	...	...	7	1	6	14·28
July	"	...	...	...	5	.....	5	.....
August	"	...	...	...	15	3	12	20·00
September	"	...	...	...	14	2	12	14·28
October	"	...	...	...	9	.....	9	.....
November	"	...	...	...	23	3	20	13·04
December	"	...	...	...	78	17	61	21·84
January	1900	...	...	...	276	72	204	26·08
February	"	...	...	...	267	72	195	26·96
March	"	...	...	...	123	35	88	28·45
April	"	...	...	...	60	19	41	31·66
May	"	...	...	...	40	8	32	20·00
Total					917	232	685	25·28

TABLE III (D).—*Cholera.*

Months.					Total Admissions.	Total Deaths.	Total Recoveries.	Percentage of Mortality.
June	1899	...	...	.....	.....	.....	.....	.....
July	"	...	...	1	1	.....	.....	100·00
August	"	...	...	.....	.....	.....	.....	.....
September	"	...	...	.....	.....	.....	.....	.....
October	"	...	...	.....	.....	.....	.....	.....
November	"	...	...	1	1	.....	.....	100·00
December	"	...	...	.....	.....	.....	.....	.....
January	1900	...	...	.....	.....	.....	.....	.....
February	"	...	...	1	1	.....	.....	100·00
March	"	...	...	2	1	1	.....	50·00
April	"	...	...	14	11	3	.....	78·57
May	"	...	...	43	37	6	.....	86·04
Total					62	52	10	83·87

TABLE IV (A).—*Plague.*

—				Number.	Died.	Recovered.	Percentage of Mortality.
Hindoos	...	...	...	883	672	211	76·10
Mahomedans...	...	...	...	48	34	14	70·83
Native Christians	...	...	...	82	52	30	63·41
Parsees	...	...	...	16	14	2	87·50
Total	...	...	...	1,029	772	257	75·02

Hindoos.

—				Number.	Died.	Recovered.	Percentage of Mortality.
Males	...	...	...	563	449	114	79·75
Females	...	...	...	192	148	44	77·08
Children	...	...	...	128	75	53	57·03
Total	...	...	...	883	672	211	76·10

Mahomedans.

—				Number.	Died.	Recovered.	Percentage of Mortality.
Males	...	...	...	39	28	11	71·79
Females	...	...	...	3	3	.....	100·00
Children	...	...	...	6	3	3	50·00
Total	...	...	...	48	34	14	70·83

Native Christians.

—				Number.	Died.	Recovered.	Percentage of Mortality.
Males	...	...	...	54	34	20	62·96
Females	...	...	...	14	10	4	71·42
Children	...	...	...	14	8	6	57·14
Total	...	...	...	82	52	32	63·41

Parsees.

				Number.	Died.	Recovered.	Percentage of Mortality.
Males	...	...	...	9	8	1	88·88
Females	...	...	...	6	6	.....	100·00
Children	...	...	...	1	.....	1	.....
Total				16	14	2	87·50

TABLE IV B.—*Relapsing Fever.*

				Number.	Died.	Recovered.	Percentage of Mortality.
Hindus	...	...	...	1,141	353	788	30·93
Mahomedans	...	...	...	171	48	123	28·07
Native Christians	...	...	...	33	11	22	33·33
Parsees	...	...	...	2	.....	2	.....
Beni Israel	...	...	...	2	1	1	50·00
Total				1,349	413	936	30·61

Hindus.

				Number.	Died.	Recovered.	Percentage of Mortality.
Males	...	...	...	817	264	553	32·31
Females	...	...	...	193	68	125	35·23
Children	...	...	...	131	21	110	16·03
Total				1,141	353	788	30·93

Mahomedans.

				Number.	Died.	Recovered.	Percentage of Mortality.
Males	...	...	...	157	43	114	27·38
Females	...	...	...	8	3	5	37·50
Children	...	...	...	6	2	4	33·33
Total				171	48	123	28·07

Native Christians.

	Number.	Died.	Recovered.	Percentage of Mortality.
Males	28	8	20	28·57
Females	4	2	2	50·00
Children	1	1	.....	100·00
Total	33	11	22	33·33

Parsees.

	Number.	Died.	Recovered.	Percentage of Mortality.
Males	2	.....	2	.....
Females ... ..	.....	.....	.....	.....
Children ... ..	.....	.....	.....	.....
Total	2	.....	2	.....

Beni-Israel.

	Number.	Died.	Recovered.	Percentage of mortality.
Males	1	.....	1	.....
Females	1	1	.....	100·00
Children ... ..	.....	.....	.....	.....
Total	2	1	1	50·00

TABLE IV C.—*Small-pox.*

	Number.	Died.	Recovered.	Percentage of Mortality.
Hindus	623	135	488	21·67
Mussalmans	90	30	60	33·33
Native Christians	204	67	137	32·84
Total	917	232	685	25·28

Hindus.

—					Number.	Died.	Recovered.	Percentage of Mortality.
Males	...	...	...	...	315	77	238	24·44
Females	...	...	...	...	115	31	84	26·95
Children...	...	...	...	...	193	27	166	13·93
Total					623	135	488	21·67

Mussalmans.

—					Number.	Died.	Recovered.	Percentage of Mortality.
Males	...	...	...	...	56	21	35	37·50
Females	...	...	...	...	9	3	6	33·33
Children	...	...	...	...	25	6	19	24·00
Total					90	30	60	33·33

Native Christians.

					Number.	Died.	Recovered.	Percentage of Mortality.
Males	...	...	...		137	47	90	34·30
Females	...	...	...		39	16	23	41·02
Children	...	...	...		28	4	24	14·28
Total					204	67	137	32·84

Of the 917 cases of small-pox, 461 were vaccinated and 456 unvaccinated. The former showed a mortality rate of 19·52 per cent. as against 31·14 in the latter.

TABLE V.

*Mortality amongst Sex and Children.**A.—Plague.*

Total Mortality for the year.	Mortality amongst Men.	Mortality amongst Women.	Mortality amongst Children (all under 12 years of age).
772=75·02 p. c.	519=78·04 p. c.	167 77·67 p. c.	86=57·71 p. c.

B.—Relapsing Fever.

Total Mortality for the year.	Mortality amongst Men.	Mortality amongst Women.	Mortality amongst Children.
413=30·61 p. c.	315=31·34 p. c.	74=35·92 p. c.	24=17·39 p. c.

C.—Small-pox.

Total Mortality.	Mortality amongst Men.	Mortality amongst Women.	Mortality amongst Children.
232=25·28 p. c.	145=35·53 p. c.	50=30·67 p. c.	37=15·04 p. c.

TABLE V (A).

Percentage of Mortality according to age Periods in Plague.

Age.	Percentage of Mortality.	Age.	Percentage of Mortality.
1. Up to 1 year ... ..	...	4. 20 years to 30 years ...	74·85
2. 1 year to 10 years ...	59·09	5. 30 „ to 40 „ ...	82·10
3. 10 years to 20 „ ...	73·51	6. 40 and upwards ...	83·49

TABLE VI.—*Showing the Situations of the Buboes.*

Situations.	Total No. of Cases.	Males.	Females.	Mortality.	Recoveries.	Percentage of Mortality.
Cervical	77	53	24	56	21	72·72
Parotid	18	13	5	13	5	72·22
Right axillary	107	64	43	87	20	81·30
Left axillary	81	56	25	67	14	82·71
Right femoral	93	68	25	65	28	69·89
Left femoral	94	73	21	61	33	64·89
Right inguinal	83	70	13	61	22	73·49
Left inguinal	67	45	22	45	22	67·16
Other situations*	28	15	13	17	11	60·71
No buboes	45	40	5	41	4	91·11
Multiple buboes	326	247	79	247	79	75·76

* Occipital, supra-clavicular, supra-hyoid, median and lateral, sub-maxillary, sub lingual, over shoulder joint, supra-trochlear, brachial, on forearm, pectoral, popliteal, calf of leg, and ilia.

TABLE VII.—*Pneumonic Plague.*

					Admitted.	Died.	Recovered.	Percentage of Mortality.
Males	...	...	...	...	22*	21	1	95.45
Females	...	...	...	...	3*	3	.....	100.00
Children	...	...	...	...	.....	.....	.....	.....
Total					25	24	1	96.00

* Bacteriological examination was made in all cases and verified by cultures.

TABLE VIII.—*Secondary Plague Pneumonia.**

					Admitted.	Died.	Recovered.	Percentage of Mortality.
Males	...	...	...	...	30	28	2	93.33
Females...	...	...	...	...	8	8	.....	100.00
Children	...	...	...	...	.....	.....	.. ..	.....
Total					38	36	2	94.73

* Secondary plague pneumonia generally supervened from the 3rd to the 7th day.

No startling developments have been observed in the types and course of plague during the epidemic of 1899-1900, and no new symptoms or phases of disease have been recorded. The virulence and intensity of plague poison was on a par with that of the epidemic of 1898-99 and there has been no appreciable change either for the better or the worse. In fact, with the exception noted below, there was nothing worth recording or deserving of special mention. The admission of patients was marked this year, more so than in any previous, by cycles of different types, one replacing the other, and disappearing just as suddenly as it came. Primary septicæmic plague, cases with marked meningeal symptoms especially in children, hæmorrhagic cases, cases developing secondary pneumonia, secondary septicæmic cases with multiple buboes in different parts of body, and cases with large cellulocutaneous necrosis, all occurred in groups and within short periods, and totally disappeared. Hæmorrhagic cases were more common during the height of the epidemic, and cases with necrosis during its decline. Secondary pneumonia was not so much in evidence but the mortality was very high.

Plague complicated with other diseases was noted as usual, and on account of the prevalence of small-pox several cases of plague and small-pox were observed. In almost all of these, plague developed first, and was followed by small-pox. Relapsing fever, malaria, and phthisis prevailed as usual. Only a few cases of the former were noticed. Special reports dealing with the cases treated with Professor Lustig's serum have been already furnished.

N. H. CHOKSY, M.D. (*Hon.-Câus:--*Freiburg),
Special Assistant Health Officer.

Report of the Mahratha Plague Hospital from 1st June 1899 to 31st May 1900.

The Hospital was originally opened by the Mahratha Committee, was subsequently handed over to the Plague Committee (now extinct), and then to the Municipality. The situation, disposition, arrangement of wards, the conservancy, water-supply, disinfection, mortuary, the arrangement for the disposal of the dead, &c., have been described in the last year's report. The following important changes have been made by Sirdar Mir Abdulalli, Khan Bahadur, and the Committee of the Hospital.

Permanent Wards.—It was found that the repair of the zaoli roofs of the wards and other sheds cost the Municipality something over Rs. 2,000. The Sirdar, thinking this annual expense to be an extra burden on the Municipality, thought it meet to erect more durable structures which would not require repairs every year. With this object in view he opened the subject to the Members of the Committee and to some of his benevolent friends, and obtained ready support from Rao Bahadur Kushaba Chapajee Kale, Mr. Tukaram Javjee, Sirdar Khan Bahadur Haji Kassum Mitha, Mr. Nowrojee Manekjee Wadia, C.I.E., Rao Bahadur Dhondiba Hanmantrao Barde, the late Rao Saheb Ghamajee Ballajee Rukare, and some wealthy fruit and hay merchants. Five wards have been built in a double row on a piece of ground belonging to the Municipality and bordering on the Connaught Road which has now been transferred to the City Improvement Trust. These wards are built of teakwood frame-work with glass doors and windows and brick masonry on the east and west. The foundation and plinth are of stone masonry about $1\frac{1}{2}$ feet above the road level. Each ward is 70 feet long and 24 feet wide with a open verandah of 3 feet all round. The flooring of the ward is of Indian patent stone and the verandah has a coping of stones all over. The roof is a gable one of Mangalore tiles and without a ceiling. The wards are well ventilated on all sides by means of flaps near the flooring; one foot open space at the top of the wooden framework on the north and south and hooded tiles placed at a distance of the two feet from the ridge of the roof to serve the place of a double roof forming ridge ventilation. The wards run from east to west and have an accommodation for 30 patients in each; so the five newly built wards of permanent structure can hold 150 beds, conveniently and comfortably. The office is a permanent building of brick masonry and teakwood frame-work with glass windows and doors. The roof has a ceiling of planks, covered with Mangalore tiles. It is 47 feet in length and 27 feet in width and is divided into three compartments, the office, dispensary and store-room, and the nurses' sitting room. The flooring is made of Indian patent stone. The building has a verandah of three feet all round. It is the gift of Rao Bahadur Dhondiba Hanmantrao Barde and the late Rao Saheb Ghamajee Ballajee Rukare.

Roads.—New roads have been constructed running between the newly built wards. It was necessary for this purpose to excavate heap of earth and blast rocky protuberances to level the ground. The central road is 286 feet long and 20 feet wide, cross roads are 60 feet long and 18 feet wide, while the two roads behind the wards are 286 feet long and 6 feet wide. All these roads are *pucca* built, metalled and rolled.

Temporary Wards.—The wards situated in the interior of the hospital compound were found to be very rickety and would not have stood in the present monsoon, so the Sirdar decided to rebuild the most worn-out ones. Each of these wards is built on a masonry plinth, $1\frac{1}{4}$ feet high, with teak rafter posts and a roof of bamboo and cocoanut zaolies. The sides are made of bamboo-ribbing and plas-

tered. Each of these wards is 84 feet long and 27 feet wide. The flooring is of mud. Each ward would hold 34 beds and would last at least 8 years without much repair.

The sheds used as observation wards are also pulled down and two nice wards, similar to those above described, have been built on the spot, but each of these wards is 105 feet long and would hold 50 beds. Thus these six wards alone are sufficient to provide accommodation for 250 patients. Besides these eleven wards there are five other temporary wards which accommodate 225 patients; these wards the Sirdar intends to rebuild after the monsoon. So there is at present accommodation for 475 patients.

A small-pox epidemic broke out in the month of December. The Arthur Road Hospital, which admitted small-pox cases, was full by the beginning of January, and the Mahratha Hospital was asked to take in small-pox cases. This was done without any distinction of caste or creed, and patients of all castes were admitted in the small-pox wards, but arrangement was made to respect their religious feelings. A ward was given to Mahrathas and other high caste Hindus. One ward was given to the low caste and one to the Christians and Mohamedans, but these three wards were not sufficient for the rush of patients, and two new wards were run up by the Sirdar within a week to meet the increasing demand. Each of these wards is 105 feet long and 27 feet broad, and would accommodate 50 patients. This accommodation was also not sufficient to meet the increasing demand, and we had to turn some of the contact sheds into small-pox wards, and thus make room for patients. The plague patients were accommodated in the permanent wards by the side of the road, while the large number of convalescents were accommodated in the old wards situated in the interior. The number of observation cases had also increased and we had to use three sheds with an accommodation of 80 beds for male patients and one of the permanent wards for females.

Visit of His Excellency the Viceroy.—The most notable event during the year under review was the visit paid by His Excellency Lord Curzon, the Viceroy of India, to the Hospital. The Hospital authorities were informed two days previous that His Excellency intended to pay a visit to the Mahratha Hospital and meet the Volunteers there. The Hospital compound and the Connaught Road were decorated with buntings and cocoanut tree leaves, and a permanent ward situated in front of the new-built wards was turned into a reception hall, which was decorated with hangings and flowers. The floor was carpeted and a raised dais was placed at the other end of the hall and a seat was arranged for their Excellencies thereon.

The morning of the 7th December 1899 presented an imposing spectacle at the Mahratha Hospital. A very large number of Volunteers and Officers came to the place and crowds of people were seen standing on the road from the Victoria Gardens down to Ghorupdeo Road. His Excellency Lord Curzon, accompanied by His Excellency Lord Sandhurst, were escorted to the place by Mr. W. L. Harvey, the Municipal Commissioner, Colonel Wilkins, the Special Medical Officer in charge Plague Operations, and the Deputy Commissioner. Their Excellencies were received at the gate by Sirdar Mir Abdulalli and the Members of the Mahratha Committee, who were introduced to His Excellency by Colonel Wilkins. His Excellency was then taken to the old temporary wards and thence to the newly built permanent wards, where Lord Curzon made very kind enquiries about the plague patients. They were then conducted to the reception hall where all the Volunteers and Officers had gathered. Their Excellencies were offered a cordial welcome by the Chief Medical Officer, and after a most instructive speech from His Excellency Lord Curzon, and the distribution of garlands and bouquets, the party returned amongst loud cheers and acclamations.

Last visit of His Excellency Lord Sandhurst to the Hospital.—His Excellency Lord Sandhurst on the eve of his departure paid a last visit to the hospital on the 7th February 1900, when he declared open the new wards, and was presented with an address by the Mahratha Committee. The address was well decorated and enclosed in a silver Cutch-work casket and a Kinkob Khalita (bag). Copy of the address and the reply by His Excellency are annexed for information.

Visit of His Excellency Lord Northcote.—Lord Northcote was pleased to pay a visit to the Hospital on 22nd February 1900. His Excellency was escorted by the Municipal Commissioner and Col. Wilkins and was received at the hospital gate by the Deputy Commissioner, Mr. DuBoulay, Sirdar Mir Abdulalli, Khan Bahadur, and the Members of the Mahratha Committee. His Excellency went round all the temporary and permanent wards and expressed a great interest and sympathy with the patients and was pleased to make a munificent donation of Rs. 1,000 to the hospital for providing certain comforts to the patients. His Excellency was garlanded and left amongst cheers and acclamations of the bystanders.

Visit of His Highness the Maharaja of Kolhapur.—His Highness the Maharaja of Kolhapur paid a visit to the hospital on 12th January 1900. His Highness was received by Sirdar Mir Abdulalli, Col. Wilkins and the Mahratha Committee. His Highness was much pleased at the arrangements for keeping the relations of the patients in the hospital compound and gave a donation of Rs. 1,500 to the Hospital and Rs. 500 for an orphanage. The party left after the distribution of garlands and *pan supari*.

Nursery.—Plague patients sent to the hospital often brought with them their children, who became orphans on the death of their parents, and having no one of their kith and kin, remained in the hospital unclaimed. About the beginning of March we had 16 such children on hand, and although they were fed in the hospital, no one particularly looked after them and they were often found wandering in the plague wards or other places in the compound. What to do with these orphans became a serious and important question. The Chief Medical Officer, in consultation with Col. Wilkins and Sirdar Mir Abdulalli, thought it safe to open a nursery and keep the children in the charge and care of some responsible person. A shed was therefore made ready and fitted with the requisite furniture, and all the children were lodged therein on the 24th March 1900. One man has been engaged to feed and look after these children, the expense of feeding the children is borne by the hospital, while the pay of the man in charge and expenses of clothing of the children are defrayed by private subscription. Lately two of these children have been claimed by some of the relations and have been given in their charge, two children died from bronchitis and diarrhoea, and now there are ten remaining in nursery. Out of these four boys who are old enough to attend school are sent to the Municipal Primary School.

Disinfection.—The permanent wards are washed daily with phenyle solution and the old mud floor wards are sprinkled with lime and sanitas powder twice a day and swept, while the walls are white-washed as often as necessary. All soiled clothing is removed from the wards and put in a large tub kept outside each ward containing disinfecting solution. It is taken out every morning and evening and washed by the mehtars and then handed over to the dhobi for final washing.

During the epidemic of small-pox the clothing of the small-pox patients were washed separately by the mehtar and taken to Arthur Road Hospital for disinfection by sterilization, and were then given to the dhobi for washing.

Disposal of the dead of Small-pox Patients.—The unclaimed bodies of the Hindus were removed to Worlee Cemetery by the corpse bearers of the hospital, while those of the Mahomedans and low castes were removed in a cart sent from the

Kamatipura Municipal Stables, whenever required. In the case of unclaimed Roman Catholic Christians, the priest who visited the hospital every day arranged for their funeral.

Mortality amongst the Staff.—Eight persons of the staff were affected with plague this year, out of which five recovered and three died :—

(1) Soolai Bhowani, who was employed as a cooly in the store-room and had to handle washed clothing, was affected with plague on the 21st September 1899. He had parotid bubo and secondary pneumonia. He was discharged cured on the 17th of November 1899.

(2). Pandu Gangajee, a ward boy, was admitted into the hospital suffering from plague on the 26th February 1900, had right cervical and left femoral buboes. He was discharged cured on 14th April 1900.

(3). Rama Baloo, a corpse bearer of this hospital, residing in 12th Lane, Kamatipura, was admitted suffering from plague with left cervical bubo and pneumonia on the 4th of April 1900 and died the next day. He was inoculated with prophylactic serum by Mr. Abadan on the 22nd September 1899.

(4). Manek Amba, a female mehtar, employed in the ward, was attacked with plague on the 17th April and was sent to the Arthur Road Hospital, whence she was discharged cured.

(5). Amtha Jetha, a female, engaged as a compound cleaner, became sick on the 13th April, and was sent to the Arthur Road Hospital where she died of plague.

(6). Narayen Krishna, a ward boy of this hospital, engaged in the plague ward residing at Khetwadi 5th Lane, was admitted in the hospital suffering from plague on 7th March. He had a right femoral bubo, which was opened, and was discharged cured on the 14th April 1900. He was inoculated by Mr. Abadan on 23rd September 1899.

(7). Bhugwan Janoo, a mussal of the hospital, was admitted for right inguinal bubo on the 8th May. He was residing on the hospital premises. He was discharged cured on the 31st May 1900.

(8). Amba Rama, a female mehtar, working in the plague ward, became ill on the 10th January 1900, and was sent to Arthur Road Hospital where she died of plague.

Clinical Observations.—There were 4,722 admissions in the year under review, out of which 2,513 were plague cases, 263 relapsing fever, 1,310 other diseases, 595 small-pox, 13 measles and 28 chicken-pox. The total mortality of plague was 81·13 per cent., but deducting the number of patients who died within 48 hours, the percentage of mortality falls down to 61·4 giving 38·6 per cent. of recovery. The total mortality of relapsing fever was 18·6 while that of small-pox 19·49 per cent. The percentage of mortality was more amongst the Christians and low castes than the Hindus.

The characteristic symptoms of the disease, incubation period, &c., have been described in the last year's report.

Buboes.—A tabular statement of the different positions of the buboes has been given under table No. VI, but I wish to notice particularly the presence of the buboes of the scalp. There were 3 such admissions in the year under report, one of which had an occipital bubo, and the other two parietal. In all these cases there was necrosis of the bone which was removed in pieces and all the patients were discharged cured.

Gangrene.—Cases of gangrene of different parts were admitted with definite plague symptoms. In all these cases the slough came off very early, the wounds looked healthy and granulating, fever disappeared, but tetanic symptoms set in and patients died of tetanus or septicæmia.

Abortion.—Generally all pregnant females affected with plague aborted. There were 8 patients admitted in the different periods of gestation, one of which delivered a living child at seven months, but the child and the mother died the next day. Two patients were admitted suffering from plague in the fourth month of pregnancy, and I am glad to report both of them did not abort and were discharged cured.

Affection of Speech.—The speech of plague patients is generally very characteristic. It is either stammering or jerking and the words are thick, but in 12 cases there was complete aphonia. The patients were quite unable to speak but understood everything addressed to them. In one case of a young man of 20, there was no one to give the patient's history and the patient himself was quite dumb. Although he expressed himself by signs, was not able to utter a single word. Some people said he was born dumb, later on during the convalescent period he developed maniac symptoms, but all this disappeared in time and he regained his power of speech. It is very remarkable how these people with complete loss of speech recover the power during the convalescent period without any special treatment.

Affection of the Eyes.—Conjunctivitis is very common in plague cases and in 10 cases there was ulceration of the cornea and staphyloma, but a point worth noting is sudden loss of sight, while the structure of the eye is in no way affected. There have been two such cases in the hospital, wherein the patients complained of complete blindness although they were in a convalescent stage. The onset of this symptom was preceded by fever. This condition lasted from two to three months and both the patients at last recovered their sight.

As to other complications, delirium, diarrhœa, vomiting, hiccough were very common. In 28 cases there was retention of urine.

Petechæ is not very common. We had only two cases wherein the eruption was well marked.

Guinea Worm.—One case was complicated with guinea worm, which was withdrawn and the case was discharged cured. It is very common in poor people, especially among those who are not permanent inhabitants of Bombay. We had several cases of guinea worm in the observation and the small-pox wards.

Sequelæ.—The sequelæ of plague were noticed in two cases. A girl Keru Genoo, aged 8 years, suffering from plague with left femoral bubo, was admitted on the 22nd February 1900. The fever came down to normal on the 14th of the next month, the bubo subsided and the patient was about to be discharged, when from the 22nd of March she began to be feverish and the temperature rose by half or one degree every day and went up to 103° F. on the 26th. From this time she began to complain that she was not able to see anything. Two days after she became unconscious and could not answer questions or do any voluntary act. She then showed signs of mania, which were characterized by exceeding sensitiveness to light and sound, disposition to sudden starting of the legs, and by smearing her bed with faeces. As she would not drink or eat anything, she was fed by nasal feeds for a period of one month, after which period she began to regain consciousness, ask for food, the maniacal symptoms disappeared and she began to answer questions rationally, but she was not able to see anything. Early in the month of May she said she could decipher faces though dimly. From this time her sight began to improve and by the end of the month she got normal sight. During the maniac period she used to lie

down with her legs drawn on the abdomen and was in this position for about two months, during which time the tendons were so much contracted that the legs could not be stretched even under chlorom. She was discharged on the 30th of June, and was advised to go to the J. J. Hospital for further treatment.

Case II.—Shewratan Alopī, a male Hindoo, aged 26 years, suffering from plague with left femoral bubo, was admitted in the hospital on the 21st February 1900. The case progressed very well till the 8th of March, when the patient, while walking, complained of inability to stand and was lifted to his bed. From this day he began to complain of his inability to use his limbs. He was able to lift up his arm or hand but was not able to put out both the hands together. The great difficulty he experienced was in taking his food, as he could not flex or put all the fingers together so as to pick up or hold any thing. The tactile sensibility was perfect but the motor power of the fingers of both the hands was lost. He is not able to stand up or put his legs firm on the ground even when supported. The right leg alone could be flexed or extended, but the left leg is paralysed. He is not able to flex it or draw it on the abdomen without the aid of his hands. The spinal column was tender. There is no other complication. After blistering the spine three or four times and taking Pot. Iodide in 10 grain doses, the motor power of the fingers of the hands has been regained. He is now able to eat his food with his own hands and can pick up things for himself, but the leg trouble still continues. He is not able to stand or get himself up, although the voluntary motor power of the right leg is in no way diminished. There has not been any improvement in the left leg.

Plague Pneumonia.—Forty-eight cases of primary plague pneumonia have been noticed during the year under review. In these cases, the appearances of the patients was characteristic. The expression was very anxious and frightened, face cyanosed, breathing hurried, cough troublesome, sputa scanty, mostly bloody. The physical examination of these patients did not reveal signs of any magnitude to account for the severity of the symptoms. Crepitation and ronchi were heard here and there, but there was no regular dullness at the bases or at the spots where crepitation could be heard. The termination of these cases was so rapid that there was no time to think of bacteriological examination. All these cases terminated fatally. They were as a rule isolated in a separate ward. Large number of cases of this malady appear in the month of October as compared with the plague cases admitted in that month.

Secondary Pneumonia.—Amongst cases with buboes, symptoms of pneumonia supervened in 131 cases. The signs and symptoms were those of ordinary pneumonia with characteristic bloody sputum. Out of these 131 cases, in 79 cases the symptoms and signs were noticed on the day of admission; in 8 cases they were noticed one day after admission; in 14 cases the disease developed two days after admission; in more 14 cases after 3 days; in 6 cases after 4 days; in 5 cases after 5 days; in 2 cases after 6 days; in 1 case after 7 days; in 1 case after 8 days; and in 1 case after 10 days. So it seems that the pneumonic symptoms set in when the temperature is high and the patient is in the acute stage of plague. Although a large number of these cases died, one has to console himself that setting in of pneumonia after the appearance of a bubo is not so fatal as the primary plague pneumonia.

M. Haffkine's Plague Prophylactic Inoculation Cases.—Fifty-eight cases of inoculation with prophylactic serum were admitted into this Hospital from 1st June 1899 to 31st May 1900; out of these 39 were plague cases and 19 observation cases. Out of the plague cases, 12 recovered and 28 died. A detailed statement is annexed.

Bacteriological Examination.—Twenty-nine samples of blood, sputum, &c., were taken by Dr. G. Taylor for bacteriological examination, out of which 18 were examined for plague bacilli, but were found only in 3 cases. Pneumo-cocci were

found in 2 and pus-cocci were found in 2, while nothing was determined of the remaining 11 cases, although there were distinct buboes in each case. Five cases were examined for relapsing fever, out of which spirillum was found in three. Three cases were examined for typhoid fever, but one case only gave the proper test. A case gave continuous fever chart, but had not the character of any of the typical fevers, so the blood was examined for Malta fever, with the result that the patient was found not to be suffering from Malta fever, he might have had it in the commencement of fever.

Complication of Plague with other Diseases.—Only two forms of epidemic diseases were noticed to have complicated with plague, namely, relapsing fever and small-pox. Seven cases, which were admitted as plague and which had distinct buboes, had also relapse of fever regularly after 10 and 12 days intervals. In one case only the blood was examined for spirillum and was found full of them.

Four plague cases were affected with small-pox :—

(1) T. M., male, aged 24, admitted on the 20th January 1900 for plague with right femoral bubo, had an eruption of small-pox on the 22nd, 2 days after admission. He was kept in a separate ward and was discharged cured on the 7th March 1900.

(2) G. T., female, aged 15, admitted for plague in January 1900, had an eruption of small-pox, semi-confluent variety, on the 22nd and was discharged cured on the 20th February 1900.

(3) G. G., male, aged 20, admitted on the 9th February 1900 for plague with right femoral bubo, had an eruption of small-pox on the 9th and died on the 17th February 1900,

(4) N. B., female, aged 20, admitted for plague with right femoral bubo on 27th February, had an eruption of small-pox of semi-confluent variety on 1st March, and was discharged cured on 4th April 1900.

Treatment.—The mode of treatment followed in this Hospital has been fully described in the last year's report. No special treatment, such as the curative serum treatment or the vapour bath treatment, was adopted this year. The general plan of treatment consisted in giving stimulants, such as carbonate of ammonia, liquor strychnia, &c. Alcoholic treatment, *i.e.*, giving 2 to 4 drachms of rum every half hour, was tried in a few cases, but was not found to be of any use. All patients got rum with their egg flip, but rum or brandy in additional quantity was prescribed whenever the tension of the pulse became feeble. In cases of gangrenous surfaces a poultice of *Eclipta Alba* was found very useful. It acted as a deodoriser and removed the slough much more rapidly than linseed poultices.

Lozone Treatment.—In the month of June 1899 some quantity of Lozone was sent to this Hospital for trial, and was administered in 3 cases, all of which died. The drug had very little influence on the temperature, but the pulse and respiration went up very high as would be seen from one of the charts annexed herewith. It had no action on the intestines or any other organ. The cases in which it was tried were of different types. The first was one of very severe type, the second was not a bad case, and the third was one of mild type.

Hypodermic Injection of Liquor Atropia.—Six cases were given injection of three minims of liquor atropia every day along with the ordinary treatment, but only one of these cases recovered.

One drop of Liquor Atropia given by Mouth.—Atropia is said to support heart's action and with that view liquor atropia in one drop doses twice a day was given in 25 cases, but the result was not encouraging in any way as only three cases out of the 25 got well.

Statistics.—The total number of admissions from 1st June 1899 to 31st May 1900 from all causes was 4,722. 3,668 patients were sent by District Officers and other plague authorities from different parts of the town, while 1,054 patients came in voluntarily. 140 patients were sent by Harbour plague authorities for observation from the Modikhana segregation camp, one of which only turned out to be a plague case. 2,025 people were sent as contacts, out of which 30 developed plague: Out of the 4,722 cases 2,273 were sent as plague and 1,813 were admitted for observation. Out of this large number of observation cases only 240 turned out to be plague, 263 relapsing fever and the rest as follows:—

Fevers—

Intermittent fever...	...	...	331
Remittent fever ...	...	...	141
Typhoid fever ...	...	...	3
Small-pox ...	...	...	2
Chicken-pox ...	...	...	1
Erysipelas...	...	...	1
Rheumatism ...	...	...	16

Diseases of the brain and nervous system—

Meningitis ...	...	...	1
Epilepsy ...	...	...	1
Convulsions ...	...	...	6
Paralysis ...	...	...	3
Tetanus ...	...	...	2
Neuralgia ...	...	...	2

Diseases of the lungs and heart—

Bronchitis ...	...	...	227
Broncho-Pneumonia ...	...	...	133
Phthisis ...	...	...	48
Pleurisy ...	...	...	1
Asthma ...	...	...	10
Heart diseases ...	...	...	9

Diseases of the liver—

Congestion ...	...	...	2
Hepatitis ...	...	...	8
Abscess of the liver ...	...	...	3
Jaundice ...	...	...	26
Ascites ...	...	...	1

Diseases of the stomach—

Vomiting ...	...	...	1
Gastritis ...	...	...	4
Dyspepsia...	...	...	6

Diseases of the intestines—

Peritonitis...	...	...	1
Intussusception ...	...	...	1
Colic ...	...	...	2
Dysentery ...	...	...	47
Diarrhoea ...	...	...	93
Constipation ...	...	...	1
Worms ...	...	...	7
Hæmorrhoids ...	...	...	3
Prolapsus ani ...	...	...	2

Other diseases—

Syphilis ...	...	...	4
Parotitis ...	...	...	3
Synovitis ...	...	...	1
Teething ...	...	...	2
Gonorrhœa ...	...	...	1
Scrofula ...	...	...	2
Septicæmia ...	...	...	3
Otitis ...	...	...	1
Menorrhagia ...	...	...	1
Psoriasis ...	...	...	2
Guinea worm ...	...	...	5
Abscesses ...	...	...	9
Ulceration of anus ...	...	...	1
Inoculation fever ...	...	...	2
Opium poisoning ...	...	...	1
General debility ...	...	...	58
No diseases ...	...	...	51

The tables herewith annexed give the details of total admissions, number of the cases of plague, relapsing fever, small-pox, chicken-pox, measles, and observation cases; the numbers of deaths occurring in each with their percentage; the position of buboes; the number of males, females, and children admitted and the number of deaths in each of the sex, with their percentage; so also the tables showing the number of primary and secondary pneumonia cases in males, females and children with the number of deaths and recoveries in each.

1. Highest number of patients in the hospital—456 on 2nd March 1900.
2. The largest number of admission on a single day—60 on 7th February 1900.
3. The largest number of deaths on a single day—33 on 18th February 1900.
4. Most fatal form of bubo is the left axillary one. It gives 88·51 percentage of mortality.

L. B. DHARGALKER,

L. M. & S.,
Chief Medical Officer.

TABLE I.—*Total admissions during the year.*

Months.	Plague.	Relapsing Fever.	Observa- tion cases, including all general diseases.	Small-pox.	Chicken- pox.	Measles.	Total.
June 1899 ...	35	4	39	...	...	...	78
July „ ...	48	10	21	...	...	...	79
August „ ...	47	6	48	...	...	...	101
September „ ...	69	1	50	...	...	...	120
October „ ...	77	14	50	...	...	...	141
November „ ...	83	14	80	...	...	...	177
December „ ...	220	17	138	...	...	...	375
January 1900 ...	336	35	202	190	10	7	780
February „ ...	504	35	165	280	6	...	990
March „ ...	596	40	219	93	7	5	960
April „ ...	356	50	222	26	5	1	660
May „ ...	142	37	76	6	...	...	261
Total ...	2,513	263	1,310	595	28	13	4,722

TABLE II.

Diseases.	Admissions.	Deaths.	Recoveries.	Percentage of Mortality.
Plague	2,513	2,039	474	81.13
Relapsing Fevers	263	49	214	18.63
Observation Cases	1,310	531	779	40.53
Small-pox	595	116	479	19.49
Chicken-pox	28	5	23	17.85
Measles	13	...	13	...
Total ...	4,722	2,740	1,982	58.02

TABLE III.—*Plague.*

Months.	Total Admissions.	Died within 24 hours.	Died within 48 hours.	Total Deaths.	Total Recoveries.	Percentage of Deaths.
June 1899 ...	35	11	10	31	4	88.57
July „ ...	48	15	7	34	14	70.83
August „ ...	47	18	10	39	8	82.97
September „ ...	69	22	14	56	13	81.15
October „ ...	77	42	9	58	19	75.32
November „ ...	83	26	17	71	12	85.54
December „ ...	220	70	46	171	49	77.72
January 1900 ..	336	110	64	275	61	81.84
February „ ...	504	171	87	416	88	82.53
March „ ...	596	191	116	487	109	81.71
April „ ...	356	96	65	294	62	82.58
May „ ...	142	44	24	107	35	75.35
Total ...	2,513	816	469	2,039	474	18.13

TABLE IIIA.—Showing the Admissions of Relapsing Fever Cases.

Months.				Total Admissions.	Total Deaths.	Total Recoveries.	Percentage of Deaths
June	1899	...	...	4	1	3	25·00
July	"	...	...	10	4	6	40·00
August	"	...	...	6	2	4	33·33
September	"	...	...	1	.....	1	.....
October	"	...	...	14	.....	14	.....
November	"	...	...	14	4	10	28·57
December	"	...	...	17	4	13	23·52
January	1900	...	...	35	11	24	31·42
February	"	...	...	35	8	27	22·85
March	"	...	...	40	5	35	12·50
April	"	...	...	50	6	44	12·00
May	"	...	...	87	4	33	10·81
Total				263	49	214	18·63

TABLE IV.—Hindus.

Sex.				Admissions.		Deaths.		Recoveries.		Percentage of Mortality.	
				High Caste.	Low Caste.	High Caste.	Low Caste.	High Caste.	Low Caste.	High Caste.	Low Caste.
				Small-	Pox	Small-	Pox	Small-	Pox	Small-	Pox
Males	...	...	...	2,822	36	1,707	4	1,115	32	60·45	11·11
Females	...	...	...	1,068	10	670	1	398	9	62·73	10·00
Children	...	...	...	621	23	314	7	307	16	50·56	30·43
Total				4,511	69	2,691	12	1,820	57	59·80	17·39

TABLE IVA.—Mahomedans.

Sex.				Admissions.	Deaths.	Recoveries.	Percentage of Mortality.
Males	...	...	...	13	4	9	30·77
Females	...	...	...	2	1	1	50·00
Children	...	...	...	14	1	13	7·14
Total				29	6	23	20·68

TABLE IVB.—*Christians.*

Sex.	Admissions.	Deaths.	Recoveries.	Percentage of Mortality.
Males	84	22	62	26·19
Females	24	7	17	29·16
Children	5	2	3	40·00
Total	113	31	82	27·48

TABLE V.

Table showing the Mortality for the year amongst Sexes and Children from Plague.

Total mortality for the year.	Mortality amongst men.	Mortality amongst women.	Mortality amongst children all under 12 years of age.
2,039	1,250	526	263

TABLE V (A).

Table showing the Mortality for the year amongst Sexes and Children from all Causes.

Total mortality for the year.	Mortality amongst men.	Mortality amongst women.	Mortality amongst children all under 12 years of age.
2,740	1,737	679	324

TABLE V (B).

Table showing Percentage of Mortality amongst the following Ages (Plague).

Ages.	Admissions.	Deaths.	Percentage of Death.
From 1 month to 1 year	6	5	83·33
„ 1 year to 10 years	256	183	71·47
„ 11 years to 20 „	602	461	76·57
„ 21 „ to 30 „	1,023	872	85·23
„ 31 „ to 40 „	425	352	82·82
„ 40 „ and upwards	201	166	82·58
Total	2,513	2,039	81·13

TABLE VI.

Table showing the Situation of Buboos.

Situation.	Total Number of Cases.	Males.	Females.	Mortality.	Recoveries.	Percentage of Mortality.
Right cervical	42	25	17	27	15	14.28
Left cervical	25	12	13	21	4	84.00
Right parotid	62	38	24	46	16	74.19
Left parotid	52	38	14	44	8	84.61
Right axillary	228	141	87	184	44	90.70
Left axillary	235	144	91	208	27	88.51
Right femoral	350	282	68	278	72	79.43
Left femoral	330	242	88	257	73	77.87
Right inguinal	253	147	106	197	56	77.86
Left inguinal	263	165	98	193	70	73.25
*Other situations	32	17	15	26	6	81.25
No buboes	613	362	151	474	39	92.39
Multiple buboes	128	93	35	84	44	65.62
Total ...	2,513	1,706	807	2,039	474	18.13
*Arm	8	6	2	7	1	87.50
Axillary	1	1	...	1	...	100.00
Biceptical	3	1	2	3	...	100.00
Foot	1	1	...	1	...	100.00
Knee	1	1	...	1	...	100.00
Intratroclicar	1	1	...	1	...	100.00
Clavicle	1	1	...	1	...	100.00
Occipital	1	...	1	1	...	100.00
Back	3	1	2	...	3	...
Iliac	5	...	5	4	1	80.00
Sub-Lingual	2	2	...	1	1	50.00
Wrist	1	1	...	1	...	100.00
Mamary	1	...	1	1	...	100.00
Pectoral	2	...	2	2	...	100.00
Elbow	1	1	...	1	...	100.00
Total ...	32	17	15	26	6	81.25

TABLE VII.

Table showing Pneumonic Plague (without Buboos).

Sex.	Admitted	Died.	Reco- vered.	Percentage of Mortality.
Males	35	31	4	88.57
Females	12	12	.....	100.00
Children... ..	1	1	.....	100.00
Total ...	48	44	4	91.66

TABLE VIII.

Table showing Cases of secondary Plague Pneumonia (complicated with buboes).

Sex.	Admitted.	Died.	Reco- vered.	Percentage of Mortality.
Males	93	82	11	88.17
Females	33	28	5	84.84
Children	5	1	4	20.00
Total ...	131	111	20	84.73

Total weekly Deaths and Percentage of Deaths to Admissions.

Week.						Admissions.	Deaths.	Percentage of Deaths.
Ending	3rd June	1899	...	...	...	10	5	50.04
"	10th	"	"	...	...	19	18	68.42
"	17th	"	"	...	...	21	12	57.10
"	24th	"	"	...	...	15	10	66.66
"	1st July	"	"	...	...	18	9	69.23
"	8th	"	"	...	...	21	5	28.80
"	15th	"	"	...	...	17	12	70.58
"	22nd	"	"	...	...	16	7	43.75
"	29th	"	"	...	...	17	11	64.70
"	5th August	"	"	...	...	20	12	60.00
"	12th	"	"	...	...	17	9	52.94
"	19th	"	"	...	...	22	11	50.00
"	26th	"	"	...	...	29	14	48.27
"	2nd September,	"	"	...	...	22	14	63.63
"	9th	"	"	...	...	22	10	45.45
"	16th	"	"	...	...	31	15	48.88
"	23rd	"	"	...	...	27	17	62.96
"	30th	"	"	...	...	37	25	67.56
"	7th October	"	"	...	...	27	21	77.77
"	14th	"	"	...	...	46	30	65.21
"	21st	"	"	...	...	19	14	73.68
"	28th	"	"	...	...	35	14	40.00
"	4th November,	"	"	...	...	32	19	59.37
"	11th	"	"	...	...	32	18	56.25
"	18th	"	"	...	...	36	15	41.66
"	25th	"	"	...	...	48	35	72.91
"	2nd December	"	"	...	...	51	28	54.90
"	9th	"	"	...	...	59	37	62.71
"	16th	"	"	...	...	92	60	65.21
"	23rd	"	"	...	...	105	71	67.61
"	30th	"	"	...	...	83	50	60.24
"	6th January 1900	"	"	...	...	118	74	62.71
"	13th	"	"	...	...	184	82	44.57
"	20th	"	"	...	...	197	110	55.83
"	27th	"	"	...	...	191	95	49.73
"	3rd February	"	"	...	...	171	95	55.55
"	10th	"	"	...	...	265	137	51.69
"	17th	"	"	...	...	265	145	54.71
"	24th	"	"	...	...	286	148	62.71
"	3rd March	"	"	...	...	247	154	62.34
"	10th	"	"	...	...	205	123	60.00
"	17th	"	"	...	...	226	147	65.04
"	24th	"	"	...	...	214	139	64.95
"	31st	"	"	...	...	214	109	50.93
"	7th April	"	"	...	...	194	140	72.16
"	14th	"	"	...	...	214	119	55.60
"	21st	"	"	...	...	157	86	54.77
"	28th	"	"	...	...	86	55	63.95
"	5th May	"	"	...	...	88	39	44.31
"	12th	"	"	...	...	55	33	60.00
"	19th	"	"	...	...	59	37	62.71
"	26th	"	"	...	...	52	27	51.94
"	1st June	"	"	...	...	43	23	53.48

Statement showing the Number of different Hindu Castes admitted in the Hospital during the Year under Report.

	Numbers.		Numbers.
Mahratha	3,824	Waisha Wani	7
Mahratha, Gowli	14	Panch Kalshi	4
„ Hajams	10	Guzerathi, Lohar	8
„ Dhobi	9	„ Durji	87
„ Telli	12	„ Hajam... ..	1
„ Dhangar	5	„ Gowli	1
„ Lohar	15	Telugu (Kamathi)	21
Brahmins, Decani... ..	43	Kansar (Bangde)	1
„ Guzerati	18	Burud	1
Shenvi	1	Ramoshi	3
Parbhus	3	Rajput	2
Marwadi	5	Sootar	6
Tambut	6	Gosavi	6
Wanjari	3	Bairagi	1
Mallee	33	Kumbhar	5
Sonar	22	Kharvi	14
Bhandari	28	Madrasa Vaishnava	2
Koli	16	Waghri	2
Salwi	2	Kathewadi	24
Agri	1	Khatri	1
Purdeshi	194	Gondhli	2
Lingayet, Wani	32	Mahar	63
Lingayet, Gowli	1	Chambhar	5
Shimpi Namdew	16	Mochi	2

List of Names of the Members of the Committee.

Numbers.	Names.
1	Sirdar Mir Abdulali, Khan Bahadur, Founder and Patron of the Hospital.
	<i>Names of the Members of the Committee.</i>
	PRESIDENT.
1	Rao Bahadur Kushaba Chapajee Kale.
	MEMBERS.
2	Rao Bahadur Dhondiba Hanmantrao Patil Burde, J.P.
3	Raghunathrao Babasaheb Malap, Esq, J.P.
4	Sudashew Succaram Hande, Esq.
5	Appajee Sudashew Dongre, Esq.
6	Tukaram Sutwajee Hande, Esq.
	TREASURER.
7	Tukaram Jaojee, Esq., J.P.
	SECRETARY.
8	Rao Bahadur Vithalrao Krisbnajee Wandeker, J.P.

List of the Office Staff, Nurses, &c.

Numbers.	Names.	Designation.
1	L. B. Dhargalker, L. M. & S.,... ..	Chief Medical Officer.
1	Suntojee Ramjee, Esq.	House Surgeon.
1	Gungaram Dharmajee	Vaidiah.
1	Miss Richardson	Sister.
2	„ Massy	„
3	„ Corbett	„
4	„ Gray	„
5	„ Aukett	„
6	„ Jessop	„
7	„ Kendall	„
8	„ Boyd	„
9	„ Greening	„
10	„ Steer	„
11	„ Roxburgh... ..	„
12	„ Winscom... ..	„
1	Mrs. Cannon	Nurse.
2	„ Rozario	„

No.	Establishment.	No.	Establishment.
4	Hospital Assistants.	4	Corpse bearers.
2	Native Hospital Assistants.	2	Mussals.
1	Compounder.	1	Cooly.
1	Native Compounder.	1	Poultice boy.
3	Clerks.	2	Bhisties.
1	Peon.	12	Line Washers.
37	Ward boys.	31	Sweepers.
17	Ayas.	2	Ramosies.
3	Cooks.	2	Punkha boys.
3	Dhobies.	24	Coolies Extra.

Serial No.	Names.	Register No.	Age.	Sex.	Caste.	Residence.	Date of Inoculation.	Date of admission.	REMARKS.
1	Gunoo Naroo ...	3559	28	Male	Mahratha	1st Carpenter Street, No. 56	23rd September 1899	9th October 1899.	Died 14th October 1899.
2	Narayan Sidoo ...	3927	39	"	"	Hut at Valpakhad	26th November	30th November 1899.	Died 3rd December.
3	Parantibai Dewn ...	4927	38	Female	"	Fardco	1st December	11th December	Died 11th December, 6 hours after admission.
4	Kashibai Krishna ...	4091	26	"	Blacksmith	Ambewadi, near Kali Chowkey	Two months ago, no documentary proof.	16th "	Died 18th "
5	Luxumilbai Baburno...	4096	20	"	Mahratha	37, Kamathipura 18th Lane	8th December. Inoculated by Dr. Kapadia.	16th "	Died 27th "
6	Kamlabai Ajpa ...	4145	42	"	"	4, Pirkhan Lane	16th December	19th "	Died 26th "
7	Gungaram Ranjee ...	4168	33	Male	"	48, Haines Road	19th October	20th "	Discharged cured on 25th February 1900.
8	Sankaram Tulsiaram...	4177	49	"	"	Chambhar Lane, Byculia	29th October	31st "	Died 21st December, 2 hours after admission.
9	Ramchandra Baloo ...	329	6	"	"	82/84, 1st Nowrojee Hill	Inoculated, no documentary proof.	14th January 1900.	Discharged cured 22nd May 1900.
10	Gencoo Naroo ...	654	28	"	"	273, Duncan Road	Do. do.	36th "	Died 21st "
11	Blukin Govind ...	468	30	"	"	24, Old Nagpada	9th January 1900	19th "	Died 21st "
12	Gunoo Krishna ...	610	45	"	Wauj	No fixed residence	No documentary proof	24th "	Discharged cured 29th April 1900.
13	Rama Bhayoo ...	660	20	"	Mahratha	No. 4, Pirkhan Lane	Inoculated, no documentary proof.	27th "	Died 3 hours after admission.
14	Govind Sukharan ...	661	11	"	"	7/8, New Nagpada	Do. do.	27th "	Discharged cured 5th April 1900.
15	Shripoti Shevram ...	814	27	"	"	Foras Road Camp	30th January. Inoculated by Dr. Chubb.	2nd February	Died 6th February 1900.
16	Dhana Sukharan ...	859	60	"	"	38, Pirkhan Lane	Inoculated no documentary proof.	4th "	Died 5th "
17	Sitarang Ransing ...	910	10	"	Purdeshi	731, Dongri Street	Do. do.	5th "	Died 7th "
18	Rukhmi Govind ...	961	30	Female	Mahratha	Gowli 4, Gowliwada	Do. do.	7th "	Died 8th "
19	Sadboo Babaji ...	1306	16	Male	Mahratha	8, Parcel Road	Inoculated, 21st August by Dr. V. Patel.	15th "	Discharged cured 13th April 1900.
20	Krishna Balaram ...	1309	28	"	Rajput	12, Gilder Street	8th November 1899. Inoculated by Dr. Shroff.	15th "	Died 19th February 1900.
21	Dhondiba Nana ...	1458	25	"	Mahratha	Near Victoria Gardens...	19th February 1900, Inoculated by Mr. Pedneker.	20th "	Discharged cured 15th March 1900
22	Gungabai Nagoo ...	1464	25	Female	"	5/6, Nowrojee Hill	8th February. Inoculated by Dr. Brackenbury.	20th "	Died 20th February 1900.
23	Radhabai Govind ...	1565	25	"	"	8, Parel Road	Inoculated a week ago before admission by Dr. R. V. Patel.	23rd "	Died 2nd March 1900.
24	Thakulbai Pala ...	1584	30	"	"	128, Bellasis Road	14th February 1900	23rd "	Discharged cured 5th April 1900.
25	Appa Luxuman ...	1682	5	Male	"	9, Kala Chowkey	Inoculated, no documentary proof.	36th "	Died 28th February 1900.
26	Tatia Kishaba ...	1713	25	"	"	Elphinstone Bridge, Camp	Do. do.	27th "	Died 5th March 1900.
27	Kashibai Faudu ...	1718	40	Female	"	84, a Hut, Shivri Road	Inoculated 2 days ago before admission, no certificate.	27th "	Died 28th February 1900.
28	Sita Maruti ...	1765	14	"	"	42/52, Gilder Street	Inoculated, no documentary proof.	28th "	Discharged cured 31st March 1900.
29	Maruti Ranji ...	1766	28	Male	"	Do. do.	Do. do.	28th "	Do. do.
30	Narayan Krishna ...	1951	25	"	"	Khetwadi 5th Lane	22nd September 1899. Inoculated by Mr. Abadan.	7th March	Discharged cured 14th April 1900.
31	Radhabai Vishnu ...	2283	25	Female	"	36, Pirkhan Lane	19th October 1899. Inoculated by Dr. Chubb.	17th "	Died 18th March 1900.
32	Yemilbai Luxuman ...	2352	12	"	"	176, Haines Road	16th March. Inoculated by Dr. Jayker.	19th "	Died on 21st March 1900.
33	Vithabai Khondu ...	2351	20	"	"	Do. do.	Do. do.	19th "	Discharged cured on 8th April 1900.
34	Rama Anurta ...	2460	23	Male	"	812, Parel Road...	Inoculated, no documentary proof.	23rd "	Died 24th March 1900.
35	Rama Mahadn ...	2675	25	"	"	Kalkadevi, Tava Naikins Wadi	Do. do.	36th "	Died 11th April 1900.
36	Shankar Baloo ...	2405	10	"	"	35/3, Parel Road	Do. do.	21st "	Died 22nd March 1900.
37	Daryao Nana ...	2730	20	"	Purdeshi	213, Two Tanks...	Inoculated 6 months ago	1st April	Discharged cured 17th April 1900.
38	Rama Baloo ...	2859	35	"	Mahratha	Kamathipura 12th Lane	Inoculated by Mr. Abadan on 22nd September 1899.	5th "	Died 8th April 1900.
39	Bayajee Sidu ...	3146	40	"	"	Roadside Connaught Road	Inoculated, no documentary proof.	5th May	Died 5th May, 5 hours after admission.

HIS EXCELLENCY THE RIGHT HONOURABLE

WILLIAM MANSFIELD,

BARON SANDHURST, G. C. I. E.,

Governor and President in Council,

BOMBAY.

MAY IT PLEASE YOUR EXCELLENCY,

We, the President and Members of the Mahratha Plague Hospital Committee, on behalf of the Mahratha community, beg most respectfully to thank Your Excellency for honouring us to-day with a farewell visit and to offer Your Excellency a cordial welcome.

The panic and the havoc that were caused by the plague during the first outbreak, giving rise to a general exodus of the masses from Bombay, meant a great loss to the multifarious industries and commerce of the City. But thanks to the foresight of Your Excellency and to the untiring efforts of Sir James Campbell the Mahratha Hospital was opened in January 1898.

Sir James Campbell from the outset requisitioned the services of Sirdar Mir Abdulali, Khan Bahadur, the founder and patron or the back-bone as appropriately termed by Your Excellency, of this Hospital. The idea was an excellent one as the establishment of this institution has saved the industries and commerce of this great City by creating confidence in the minds of the panic-stricken proletariat. Here plague patients of the various sects of the Hindu community except those of low castes are admitted. Recently the average number of cases under treatment has been about 350 per diem, but there is accommodation for over 500 souls now and provision can be made for more if necessary. Small-pox patients have also now been received in large numbers without any distinction of caste or creed.

We may be permitted here to mention some of the principal causes of the immense popularity of this unique institution. The patients are allowed free choice of treatment (English, Native, or their own) and their relations and friends have access to them at all times without any restriction. Moreover, ample accommodation is made for contacts, who live in the Hospital compound and wait upon their dear and near ones. These facilities and concessions have inspired the working classes of the Mahratha community with confidence to such an extent that most of those attacked by the dire epidemic repair to this Hospital, without any fear or compulsion, and apply for admission even when they are not suffering from plague.

Your Excellency has always evinced the keenest interest in the welfare of this Institution and honoured us by frequent visits. It will be impossible to find appropriate words to describe the great encouragement and support we have ever received at the hands of Your Excellency, and of those officials of Government who have been nobly combatting this terrible scourge. We cannot refrain ourselves from expressing our deep sense of regret at the fact that Your Excellency's term of office expires shortly.

The thought that Your Excellency, who has been so sympathetic with suffering humanity, is soon to be separated from us has caused us all great sorrow and the only consolation we find lies in the fact that Your Excellency is going home to be among Your Excellency's friends and relations, where Your Excellency will be able to enjoy a well earned rest after Your Excellency's arduous work here as the Governor. The high post which Your Excellency has held here as the representative of Her Majesty the Queen-Empress is even in the most ordinary times of a responsible and onerous character, but the whole term of Your Excellency's

office has been such as would have taxed the mind and energy of the best tried statesman to steer the ship of administration in safety to its port of destination. The skill, patience, and resolution with which Your Excellency handled every administrative problem during these exceptionally trying years will long be remembered in the annals of Bombay, and Your Excellency's characteristic sympathy for all classes and communities will transmit Your Excellency's name to posterity as that of one of the most benevolent and sympathetic Governors who ever held sway in Western India.

Your Excellency on the occasion of Your Excellency's visit to this Hospital in April last expressed "that it would be a pity to pull down these beautiful groups of buildings." We, benefitting ourselves by this noble hint, have ever since, with the assistance of the indefatigable Sirdar, been endeavouring our best to turn this Institution into a permanent Epidemic Hospital for the general public by constructing substantial wards, and it is gratifying for us to bring the fact to Your Excellency's kind notice that five such wards and a dispensary are now ready and the question of building more for Hindus and others is under consideration. The healthy, isolated, beautiful, and central position which this Hospital commands is one of the most cogent reasons in support of its being turned into a permanent Institution. From the very commencement we were convinced that for a hospital of this description the best site would be outside of the highly congested areas of the City, and philanthropic citizens like His Highness Sir Sultan Mahomad Shah Aga Khan, K.C.I.E., Sir Dinshaw Maneckji Petit, Bart., Mr. Naoroji Maneckji Wadia, C.I.E., Sir George Cotton, Knight, and others who have already rendered material assistance to this Hospital, will no doubt further place suffering humanity and the general public under their obligation by responding generously to any future appeal for help.

This Institution owes a great deal for its efficiency and popularity to the ladies who have travelled thousands of miles in the cause of humanity, putting their own lives into jeopardy, to nurse the unfortunate victims with commendable sympathy, devotion, and tenderness. Great credit is also due to the Chief Medical Officer, Dr. L. B. Dhargalkar, and to Dr. Santoji Ramjee, the House Surgeon.

We avail ourselves of this opportunity to express the keenest sense of gratitude which we entertain towards Sir Andrew Wingate, the Honourable Mr. Snow, C.I.E., the Honourable Mr. Woodburn, Mr. Harvey, Mr. Du Boulay, Lt.-Colonel Wilkins and Major J. P. Barry, I.M.S., for the excellent services rendered to this Hospital and for the keen interest they have always evinced in its welfare. Our grateful thanks are also due to Messrs. Vincent, C.I.E., Kennedy and Gell for lending us the services of the Sirdar, and cheerfully giving all possible assistance whenever required. We wish Your Excellency and Lady Sandhurst *bon voyage* and offer our heartfelt prayers to the Almighty for your long life, success and prosperity. May He shower upon Your Excellencies His choicest blessings!

We beg to subscribe ourselves as Your Excellency's gratefully.

President.

Kushaba Chapaji Kale.

Members.

Dhondiba Hanmantrao Barde.
Raghunath Babasaheb Malap.
Sadashiv Sakharan Hande.
Appaji Sadashiv Dongre.
Tukaram Satwaji Hande.
Ramji Ghamaji Rukare.

Hon. Treasurer.

Tukaram Javaji Chowdhari.

Hon. Secretary.

Vithalrao Krishnaji Vandekar.

Bombay, 7th February, 1909.

His Excellency Lord Sandhurst, who was received with cheers, said:—Mr. Aunali, Mr. Wandeker, Ladies and Gentlemen,—This is the last time that I shall have a chance of coming to the Mahratha Plague Hospital, a group of buildings that I have known ever since its commencement, when it did not cover so much space as it does at present, and when its benefits were not so clearly known as they are to-day. I have been able owing to the munificence of other people to open the new wards which are a fitting addition to the hospital buildings, as they were before these additional buildings were erected. We cannot be too grateful to the generous donors who have placed their means at the disposal of the Committee, and it is indeed a great instance of public spirit which has prevailed ever since the plague began, and we see our rich merchants coming forward to assist everywhere those who are unable to help themselves. I know very well how much the community and how much the sick poor owe to the indefatigable efforts, as they have been well described in the address, of Sirdar Mir Abdulali. I very much question whether without his indefatigable energy and his habits of persuasion it would have been possible to get together all these mass of buildings so fully equipped as they are, and so useful from every point of view. Supposing there had been no Sirdar we might have been able to get together these plague buildings, which were so acceptable to all those for whom they are intended, but at any rate we cannot be too thankful that we have a Sirdar among us who was willing to put his shoulders to the wheel and through whose instrumentality we have such good results achieved. There are two or three interesting features about this hospital. One was that it was not merely a plague hospital, but which has side by side accommodation for those whose friends were sick within the hospital. It is in fact a large and novel kind of organization—an organization on the best possible system—supervised by those who were best able to judge of the proper requirements. I trust it will be long after the plague shall disappear—and disappear it will in time—I trust it will be long before these buildings which are so well adapted for the purpose of an infectious hospital, will be demolished. You have been lucky in getting a site of such a wide area as you require. This is not, as you will know one building, just one infectious hospital, but it is as I have described it as a group of buildings admirably adapted and well ventilated. I very much doubt that you will find other rooms or wards with better accommodation and ventilation than the new wards which I have just opened. I will now say a word or two in regard to the allusion made in the address of the service of the body of nurses who have come out to assist us in our work. Before I came out to this country, I had a great deal to do with the nurses in the various hospitals, and I am perfectly certain of this, and I question whether anybody will assert to the contrary, that no hospital is complete without its proper complement of nurses. I do not for a moment draw any distinction or any comparison between the duties of doctors and of nurses, but I know I am almost certain that every doctor will tell you that his establishment is absolutely incomplete without nurses, properly and thoroughly trained, and who had in fact ample opportunity and testimony to prove that in innumerable cases the nurses who have come out and have placed their experience and talents at our disposal have ample experience of the way in which they have rightly got into a line and working order hospitals which were not in such a happy position and have given a finishing touch to such an organization. Now, ladies and gentlemen, I regret extremely that this is my last visit that I shall pay to the Mahratha Hospital. I shall take away with me the recollections of the Institution which will endure with me, I can assure you, for many long years. Memories are short and I daresay may have forgotten the great state of anxiety and fear bordering at one time on panic which prevailed in Bombay some three years ago. That panic now has ceased to exist. We have ourselves learned a great deal. I here again bring another instance of the usefulness and sympathy of our friend Sirdar. It is not easy, ladies and gentlemen, I can assure you, to get money for an institution, however praiseworthy its object may be. I have had myself to beg for

institutions of great importance for funds to carry them on. I know I have met with a number of discouraging replies with which one often meets, but still in connection with the hospital we see that during the last six weeks this institution has not only increased in its size but also in its value. Now, gentlemen of the Committee, I have to thank you for the address which you have presented me to-day. Certainly a great deal of my administration has been bound up with the word plague, but that very word plague has brought me in close contact not only with the officers of Government and unofficial gentlemen in high position, but also with the great masses of the public of Bombay. There have been many visits which if it were not for the word plague, I should have said it was a pleasure to make. In these visits I have come across every community that exists in the City, and probably in no other town of the world a larger number of communities can be found. But I do not think it is an useless surplusage to repeat it that, coming among you as a stranger five years ago, I knowing the characteristics of the people of this City and of this Presidency over which I have the honor to preside, I have been struck, as everybody else who had observed at all must have been struck with the loyal co-operation with which all classes, from the richest to the poorest, had been equally animated when I look back over these years. I question whether there is any population in the world which, after the first touch of panic had passed by, could have behaved so bravely and so heroically. I thank you, ladies and gentlemen, again for your address. I have no doubt whatever of the usefulness of the institution. I cannot but think that this institution is on a line of education for others; and long after the plague shall cease to exist, and long after the new scourge of small-pox will pass by, I trust that the Mahratha Hospital where it stands will continue to flourish and will be an institution to the assistance of which many rich people will come forward to aid the cause of humanity.

No. 3.

Report on the Modikhana Plague Hospital, Bombay, from the 1st June 1899 to 31st May 1900.

Staff.

The following was the maximum staff employed at the Hospital :—

1 Medical Officer.	2 Cooks.
5 Lady Nurses.	3 Dhobies.
2 Local Trained Nurses.	1 Lime-washer Muccadum.
2 Hospital Assistants.	8 Coolies.
1 Clerk.	4 Ramosis.
1 Compounder.	10 Mehtars.
1 Muccadum of ward-boys.	4 Mehtranis.
10 Ward-boys.	2 Halalkores.
4 Ayahs.	

In addition to the above the following staff was employed at the Sterilizer —

- 1 Engineer.
- 1 Fireman.
- 3 Coolies.

During the period under report the following Lady Nurses worked in this Hospital :—Miss Fry, Miss Scott, Miss Riley, Miss Burrows, Miss Smith, Miss Barrow, Miss Harvey, Miss Greening, Miss Goldney, Miss Marshall, Miss Roxburgh, Miss Massey, and Miss Riddick.

To all these ladies best thanks are due for their devotion to their work and for the very valuable assistance rendered by them. Hospital Assistant Bhikhabhai Haridass also rendered valuable service.

Hospital Buildings.

3. Four of the old matting-and-cudjan wards have been replaced by more permanent structures with wooden sides and corrugated iron roofs. The floors, however, not being pucca, are liable to soak up all discharges. The corrugated roof is painted on the outside with a mixture of lime and cocoanut-oil, which considerably helps to reduce the temperature of the ward during the hot weather.

It is hoped that the office, the Resident Medical Officer's quarters, and the other out-houses will also be similarly replaced. This will certainly do away with the annual heavy expenditure incurred for providing tarpaulins and weather frames. A suitable pucca store-room is also badly needed.

Sisters' Quarters.

The sisters' quarters have been enlarged, and accommodation increased for three more lady nurses. The plot of ground on which they have been built is however badly drained and much inconvenience and nuisance is caused during the rainy season by the accumulation of storm-water near the bungalow.

Parsee Ward.

A ward was opened at the Modikhana Hospital for the admission of Parsee plague patients in July 1899, and the following staff was maintained by the Parsee Punchayet Trust for their use :—

- 1 Parsee Nurse.
- 2 Ward-boys.
- 2 Ayahs.

The necessary clothing, mattresses, &c., and any extras required were supplied by the Secretary of the Parsee Punchayet who often visited the ward and always took a very keen interest in the Parsee patients in the Hospital.

Conservancy, Water-Supply and Disinfection.

4, 5, and 6. These have been fully described in the Hospital Report for the previous year, and there have been no alterations in the arrangements.

All the Hospital clothing is sent to the sterilizer for disinfection daily as before.

Disposal of the Dead.

7. All claimed bodies are removed by friends or relations. Unclaimed bodies are disposed of at Municipal expense as before. There are no corpse-bearers living on the premises.

Mortuary.

The old mortuary has now been replaced by a pucca structure with a cement floor and corrugated iron roof and sides ventilated with perforated tin sheetings. The size of the shed is about 20' by 10'.

Haffkine's Cases.

8. The following table gives all the important particulars of the 12 cases that had been previously inoculated with Haffkine's vaccine and were admitted into the Hospital suffering from plague :—

Number.	Register Number.	Name.	Age, years.	Sex.	Date of		Result.	Remarks.
					Admission.	Inoculation.		
1	3149	Nadirsha Rustomji ...	12	M	9-10-1899	Two years before.	Discharged 2-11-99.	
2	3290	Parsadia Bichu ...	16	M	14-11-1899	5-9-99 ...	Discharged 23-11-99.	Inoculated by Dr. B. S. Shroff, Inoc. Certificate No. 569.
3	3171	Samuel Smith ...	20	M	14-10-1899	Six months before.	Discharged 16-11-99.	
4	3433	Mahipatram Veniram.	21	M	14-12-1899	Six months before.	Died 24-12-99	Was inoculated at Anand.
5	3612	Durga Maharaj ...	35	M	2-1-1900	27-9-99 ...	Died 5-1-1900	Inoculated by Dr. Bardi. Certificate No. 325.
6	3404	Mamtahai Maruti ...	13	F	10-12-1900	A month before.	Discharged 3-1-1900.	Inoculated at Kumbharwada in C. Ward.
7	4052	Subaji Laduba ...	25	M	15-2-1900	1898 and 99.	Died 15-2-1900.	Was inoculated twice.
8	6212	Anton Rodrigues ...	16	M	20-3-1900	Three months before.	Discharged 15-4-1900.	Inoculated at Mr. Eranson's Bungalow.
9	6331	Shaik Ibrahim Shaik Yacoub.	24	M	4-4-1900	Three months before.	Died 5-4-1900.	} Were inoculated at the 21st Bombay Infantry Lines
10	6332	Pascos Lobo ...	30	M	4-4-1900	Nine days before.	Died 7-4-1900.	
11	6368	Ithu Rama ...	32	M	8-4-1900	Six months before.	Died 9-4-1900.	
12	6442	Lalia Bapu ...	20	M	14-4-1900	Six months before.	Discharged 13-6-1900.	Was inoculated twice near the Municipal Office.

9. Two of the Mehtars were attacked with plague (serial numbers 2 and 12 in the previous table). Both had been previously inoculated with Haffkine's vaccine, and both recovered. In the former the bubo subsided; in the latter it suppurated and was incised.

One Mehtar died of Relapsing Fever. They all lived on the premises: the source of infection was probably Hospital work.

TABLE 1.

Total admissions during the year.

Months.					Plague.	Relapsing.	Observation including all general diseases.	Total
June	...	...	...	...	10	1	9	20
July	...	...	...	...	37	1	22	60
August	...	...	...	...	36	1	64	101
September	...	...	...	...	45	4	55	104
October	...	...	...	...	51	6	62	119
November	...	...	...	...	55	1	54	110
December	...	...	...	...	155	1	94	250
January	...	...	...	...	185	1	127	313
February	...	...	...	...	165	18	115	298
March	...	...	...	...	181	25	94	300
April	...	...	...	...	132	28	94	254
May	...	...	...	...	55	31	40	126
Total					1,107	118	830	2,055

11. The largest number of admissions was 96 during the week ending the 16th February 1900. The largest daily number admitted was 22 on the 21st of December 1899.

12. The total number of deaths during the year was 1,205. The total number of deaths from plague was 894. The largest number of deaths was 14 on the 19th January 1900.

Weekly percentage of deaths to admissions.

Week ending.		Percentage.	Week ending		Percentage
2nd June 1899	...	100	1st December 1899	...	66.6
9th "	...	33.3	8th "	...	43.1
16th "	...	37.5	15th "	...	40.6
23rd "	...	66.6	22nd "	...	73.6
30th "	...	50	29th "	...	52.2
7th July 1899	...	62.5	5th January 1900	...	64.7
14th "	...	58.8	12th "	...	47.6
21st "	...	53.8	19th "	...	76.6
28th "	...	46.6	26th "	...	57.3
4th August 1899	...	33.3	2nd February 1900	...	59.4
11th "	...	23.8	9th "	...	53.5
18th "	...	40	16th "	...	55.2
25th "	...	45	23rd "	...	59.7
1st September 1899	...	46.6	3rd March 1900	...	58.2
8th "	...	162.5	10th "	...	63.4
15th "	...	53.3	17th "	...	58.2
22nd "	...	53.6	24th "	...	54.6
29th "	...	24	31st "	...	65.4
6th October 1899	...	53.5	7th April 1900	...	42.6
13th "	...	22.5	14th "	...	47.6
20th "	...	62.5	21st "	...	68.1
27th "	...	45.8	28th "	...	47.2
3rd November 1899	...	48.6	5th May 1900	...	55.3
10th "	...	61.9	12th "	...	40.4
17th "	...	72	19th "	...	25.0
24th "	...	63.3	26th "	...	37.2
			31st "	...	23.8

TABLE II.

	Admission.	Deaths.	Recoveries.	Percentage of mortality.
Plague	1,107	894	224	80·8
Relapsing Fever	118	39	73	33·3
Observation and other Diseases ...	830	272	552	32·7
Total ...	2,055	1,205	849	58·6

P.S.—It will be seen that the totals of Deaths and Recoveries does not tally with the total number of admissions. This is due to there being no columns for the balance of old cases on the 1st of June 1899, and also for the cases remaining in the hospital under treatment on the 31st of May 1900.

TABLE III (A).

Months.	Total admissions.	Died with- in 24 hours	Died with- in 48 hours	Total deaths.	Total recoveries	Percentage of deaths.
June	20	1	2	10	34	50
July	60	17	6	36	35	60
August	101	13	7	36	50	35·6
September	104	13	15	47	46	45·1
October	119	17	15	65	47	54·6
November	110	23	14	70	53	63·6
December	250	44	28	143	76	57·2
January	313	51	46	205	102	65·4
February	298	66	27	179	107	60
March	300	67	30	198	116	60
April	254	46	20	151	111	59·4
May	126	19	13	65	72	51·5
Total ...	2,055	377	223	1,205	849	...

TABLE III (B).

Months.	Total admissions of Plague.	Died with- in 24 hours	Died with- in 48 hours	Total deaths.	Total recoveries.	Percentage of deaths.
June	10	1	2	7	15	70
July	37	14	5	29	10	78·3
August	36	13	5	29	7	80·5
September	45	13	11	34	7	75·5
October	51	16	9	40	6	78·4
November	55	18	9	46	12	83·6
December	155	39	18	113	21	72·9
January	185	46	33	156	26	84·3
February	165	57	23	128	32	77·5
March	181	58	23	150	33	82·8
April	132	41	16	115	29	87·1
May	55	16	11	47	20	85·4

TABLE III (C).—*Relapsing Fever.*

Months.					Total Admis- sion of Relap- sing Fever.	Total Deaths.	Total Recoveries.	Percentage of Deaths.
June...	...	...	...	...	1	0	3	.....
July...	...	...	...	...	1	0	2	.....
August	...	...	...	...	1	0	1	.....
September	...	...	...	...	4	1	1	25
October	...	...	...	...	6	3	3	50
November	...	...	...	...	1	1	3	100
December	...	...	...	...	1	0	0	.....
January	...	...	...	...	1	0	1	.....
February	...	...	...	...	18	6	4	33·3
March	...	...	...	...	25	11	16	44
April...	...	...	...	...	28	9	20	32·1
May...	...	...	...	...	31	8	19	25·8

TABLE IV.—*Hindoo.*

Sex.					Total Admis- sion.	Deaths.	Recoveries.	Percentage of Deaths.
Males	...	...	...	...	1,345	854	511	63·4
Females	...	...	...	...	200	128	66	64
Children	...	...	...	...	82	38	42	46·3

Mussulman.

Sex.					Total Admis- sion.	Deaths.	Recoveries.	Percentage of Deaths.
Males	...	...	...	...	173	53	111	30·6
Females	...	...	...	...	25	10	10	40
Children	...	...	...	...	6	2	4	33·3

Christian.

Sex.					Total Admis- sion.	Deaths.	Recoveries.	Percentage of Deaths.
Males	...	...	...	...	107	55	57	51·4
Females	...	...	...	...	25	17	6	68
Children	...	...	...	...	6	1	4	16·4

Parsee.

Sex.					Total Admis- sion.	Deaths.	Recoveries.	Percentage of Deaths.
Males	...	...	...	...	45	23	22	51·1
Females	...	...	...	...	26	16	10	61·5
Children	...	...	...	...	13	8	5	61·5

Chinese.

Sex.					Total Admis- sion	Deaths.	Recoveries.	Percentage of Deaths.
Males	...	...	...	...	1	.....	.....	.....
Females	...	...	...	...	.....	.....	.....	.....
Children	...	...	...	...	.....	.....	.....	.....

Japanese.

Sex.					Total Admis- sion.	Deaths.	Recoveri- s.	Percentage of Deaths.
Males	...	...	...	...	1	.....	1	.....
Females	...	...	...	...	.....	.....	.....	.....
Children	...	...	...	...	.....	.....	.....	.....

TABLE V.

Table showing the mortality for the year amongst sexes and children.

Total mortality for the year.	Mortality amongst men.	Mortality amongst females.	Mortality amongst children.
1,205	985	171	49

TABLE V (A).

Percentage of Mortality amongst the following ages.

Up to 1 year	...	...	...	...	...	44.1
1 year to 10 years	...	...	...	...	...	44.7
10 „ to 20 „	...	...	...	...	...	51.3
20 „ to 30 „	...	...	...	...	...	55.3
30 „ to 40 „	...	...	...	...	...	64
40 and upwards	...	...	...	...	...	70

TABLE VI:

Table showing the situation of Buboes.

Situation.				Total No. of Cases.	Males.	Females.	Children.	Mortality.	Recover- ies.	Percentage of Mortality.
Cervical	...	...	...	45	28	11	6	40	8	88.8
Parotid	...	...	...	13	9	4	...	11	2	84.6
Right Axillary	...	...	...	86	62	16	8	73	12	84.8
Left Axillary	...	...	...	87	65	18	4	72	15	82.7
Right Femoral	...	...	...	153	123	23	7	119	42	77.7
Left Femoral	...	...	...	136	105	19	12	112	26	82.6
Right Inguinal	...	...	...	132	101	19	12	98	35	74.2
Left Inguinal	...	...	...	139	112	22	5	103	32	77.6
*Other Situation	...	...	...	8	3	3	2	4	2	50
No Buboes	...	...	...	130	110	19	1	112	16	86.1
Multiple Buboes	...	...	...	96	72	15	9	64	33	66.6

* Popliteal, one.
Submaxillary, two.
Clavicular, one.

Crural, one.
Pelvic, one.
Scalp, one.

Lateral Thoracic, one.

TABLE VII.

Table showing Pneumonic Plague without Buboes.

					Admission.	Died.	Recoveries.	Percentage of Mortality.
Male	...	...	...	...	74	74	.....	100
Female	..	...	...	...	8	7	1	87.5
Children	...	...	...	...	.....	.....	.....	.....

TABLE VIII.

I regret I am unable to supply figures for the actual number of bubonic plague cases which developed secondary pneumonia. I am of opinion, however, that about 80 per cent. of such cases show signs of secondary pneumonia generally about the third or fourth day.

Clinical Notes.

All the clinical symptoms of plague have been fully described in the Hospital Report for the last year, but the following clinical features noticed during the year may be found interesting.

Glandular Relapsing Fever.

A certain number of cases have come under notice which, from all signs and appearances, look like cases of bubonic plague. These cases are generally admitted with high fever, restlessness, delirium, stammering speech, injected eyes, quickened pulse and respirations and cooing râles over one or both lungs. The tongue is furred, there is troublesome vomiting, liver and spleen much enlarged and acutely tender. There may be hæmorrhages from the various mucous membranes, and in addition to all these signs one or more buboes are distinctly felt. The buboes consist of enlarged and tender glands, sometimes in chains, at other times with marked infiltration of the surrounding tissues. They are chiefly met with in inguinal and femoral regions, sometimes in axillary, parotid and cervical regions.

Microscopical examination of the blood taken from these buboes showed the presence of spirochetæ obermeierii, and the subsequent clinical history also proved that these cases were of relapsing fever. The buboes generally subsided, but in a few cases suppuration took place. Some of the cases of what was thought to be parotitis similarly turned out to be cases of relapsing fever.

Dr. Taylor very kindly examined some of these cases and confirmed the diagnosis.

Plague Phlyetene.

Another clinically interesting phenomenon noticed was that in a certain number of plague cases a distinct and characteristic cutaneous lesion was met with marking the spot of the entrance of the plague bacilli into the system.

The reasons for supposing this lesion to be the seat of the primary infection of plague are these:

1. The lesion appears before the other symptoms of infection from plague and the formation of the bubo.
2. It shows a constant presence of B. Pestis in its contents.
3. It is invariably accompanied by the presence of a bubo in the nearest proximal lymphatic gland.

This lesion, which has been termed "Plague Phlyetene" by Simond, appears at first as a small vesicle containing a clear fluid, and shows a slight umbilication. Surrounding it is a zone of inflammatory redness, and the part of the skin on which it is situated shows a considerable infiltration. At this stage the contents of the phlyetene will be found to be a pure culture of plague bacilli. It then goes on increasing in size, along with the inflammatory infiltration, and the vesicle then gives way near the central depression exposing a dirty greyish slough at its base. The discharge now becomes purulent and will be found to contain cocci in addition. If the patient

survives, phlyetene goes on increasing still further, and may attain a size of even three inches in diameter. The slough now begins to be detached at the circumference of the phlyetene with the formation of much offensive greenish pus. The ulcer left after the slough has completely detached itself is also characteristic. It is perfectly circular, the margins are indurated and raised, and the base which shows indolent or no granulations is at a much lower level than the surrounding skin, so that the ulcer appears as if it has been punched out of the skin. The foetid discharge alters with the appearance of healthy granulations, and becomes laudable pus. But the whole process of repair is extremely slow, and the ulcer heals only after a considerable length of time.

The plague phlyetene is liable to be confounded with plague blisters and boils and other plegmonous and gangrenous infiltrations of the skin arising from secondary infection through the circulatory system. These are, however, distinguished from the phlyetene by the following signs :—

1. They make their appearance during the course of an attack of plague and not at the beginning.
2. They may be situated anywhere on the skin, and bear no definite relation to the bubo.
3. They do not show the characteristic local reaction of a phlyetene.

Treatment.

No changes have been made in the stimulant line of treatment followed in the previous year, except that atropine is now given as a routine course in every case of plague admitted into the Hospital.

Atropine Treatment.

The efficacy of this drug was first shown by Dr. Row in his experiments on lower animals, the full details of which, with the interesting blood pressure charts, will be found in the papers read by him before the Medical and Physical Society, Bombay.

The chief difficulty met with is to regulate the dose of atropine. For it is sometimes found that while in some cases a very small dose of the alkaloid will suffice to widely dilate the pupils, and cause all the symptoms of poisoning, in other cases a dose of even three times the quantity will produce absolutely no effect.

Clinically I can confirm Dr. Row's observation that plague buboes treated with atropine show no signs of pus, and that when opened they show a mass of slough which cuts with a slightly gritty feel.

This fact alone is very interesting and important, and cannot be explained except by supposing that atropine has a distinct antagonistic effect to the toxin of plague.

Lustig's Serum.

66 cases treated with Lustig's serum. A tabulated list of these will be seen in the appendix.

Bacteriological Examinations.

In conclusion I have to thank Dr. Taylor for making bacteriological and microscopical examinations of blood and sputa. In all 62 examinations were made, of which 34 were blood samples, 25 agar cultures, and 3 blood serum capsules for testing Widal's reaction for typhoid and Malta fever.

Observation Cases.

The total number of observation cases admitted was 830. These generally turned out to be:—

Diarrhoea.	Small-pox and Chicken-pox.
Dysentery.	Pneumonia.
Malarial Fevers.	Beri-beri.

D. A. TURKHUDD, M.B., C.M., EDIN.,

Chief Medical Officer,

Modikhana Hospital,

Cases treated with Lustig's Curative Serum.

Appendix to the Report of the Modikhana Plague Hospital for the year 1899-1900.

No.	Regis- ter No.	NAME.	Date of admission.	Caste.	Age, years.	Sex.	Bubo.	Total quanti- ty of serum injected.	Number of horse.	Bleeding.	REMARKS.	Date of discharge.	Date of death.
1	3844	Bhimji Giga ...	... 24th Jan. 1900.	Hindu	55	M.	Left Inguinal ...	... 120 c. c. ...	7	1st	Admitted exhausted. Phlyetene unaffected by serum.	...	26th Janu- ary 1900.
2	3849	Bhenece Daji ...	... 25th " ...	Do.	14	F.	Left Inguinal ...	... 125 " ...	"	"	Death from exhaustion ...	...	2nd Febru- ary 1900.
3	3847	Chandroo Satooji ...	... 25th " ...	Do.	22	M.	Left Axilla. R. Inguinal ...	... 140 " ...	"	"	Buboes suppurated, incised ...	9th March 1900.	...
4	3857	Gulab Bala ...	... 26th " ...	Do.	12	"	Rt. Axilla. Rt. Submaxillary.	80 " ...	"	"	Violent delirium ...	...	30th Janu- ary 1900.
5	3859	Govinda Ganoo...	... 26th " ...	Do.	30	"	Right Inguinal...	... 60 " ...	"	"	Death in 19 hours. Sudden heart failure.	...	27th "
6	3864	Savla Joti ...	... 26th " ...	Do.	20	"	Left Inguinal ...	... 110 " ...	"	"	Bubo suppurated, incised ...	9th March 1900.	...
7	3870	Tuka Limba ...	... 27th " ...	Do.	11	"	Right Femoral ...	... 45 " ...	"	"	Slight delirium. Death in 30 hours.	...	28th Janu- ary 1900.
8	3874	Maruti Hari ...	... 27th " ...	Do.	30	"	Right Axilla ...	... 70 " ...	"	"	Bubo diffused. Abdominal dis- tension.	...	31st "
9	3882	Dina Luximan ...	... 28th " ...	Do.	25	"	Right Inguinal...	... 40 " ...	"	"	Death in 12 hours. Melena and homaturia before death.	...	28th "
10	3884	Banubai...	... 28th " ...	Do.	22	F.	Left Femoral ...	... 40 " ...	"	"	Unconscious. Secondary pneu- monia. Delirium.	...	31st "
11	3887	Samon Vaz ...	... 28th " ...	Christian	40	M.	Right Axilla ...	... 20 " ...	"	"	Admitted collapsed. Death after 1 hour.	...	28th "
12	3891	Rameshwardas Ganesy	... 30th " ...	Hindu	45	"	Right Femoral ...	... 110 " ...	"	"	Bubo incised. Much burrowing of pus. Death after 17 days from exhaustion.	...	15th Febru- ary 1900.
13	3896	Sadoo Hari ...	... 30th " ...	Do.	40	"	Right Femoral ...	... 40 " ...	"	"	Death in 12 hours. Sudden cardiac failure.	...	31st Jan. 1900.
14	3898	Dowlata Changooji ...	... 30th " ...	Do.	25	"	Right Axilla. Lt. Inguinal...	40 " ...	"	"	Death from sudden cardiac failure.	...	31st "
15	3907	Ganoo Itana ...	... 1st Feb. 1900...	Do.	25	"	Right Inguinal ...	... 40 " ...	"	"	Death in 18 hours ...	...	2nd Feb. 1900.
16	3909	Shivshankar Balli ...	... 1st " ...	Do.	25	"	Rt. Femoral. Rt. Popliteal ...	80 " ...	"	"	Both buboes subsided ...	33rd Feb. 1900.	...
17	3911	Rajputi Ghora ...	... 1st " ...	Do.	20	"	Left Femoral ...	... 90 " ...	"	"	Bubo incised ...	3rd March 1900.	...

No.	Regis- ter No.	NAME.	Date of admission.	Caste.	Age, years.	Sex.	Bubo.	Total quanti- ty of serum injected.	Number of horse.	Bleeding.	REMARKS.	Date of Discharge.	Date of Death.
18	3917	Dullab Bhikoo ...	... 1st Feb. 1900.	Hindu	30	M.	Left Femoral ...	100 c. c.	7	1st	Bubo suppurated, incised. Death on 11th day from exhaustion.	...	11th Feb. 1900.
19	3920	Roopan Pooran ...	... 2nd "	Do.	25	"	Right Inguinal... "	40 "	"	"	Semi-unconscious. Cardiac failure.	...	5th "
20	3923	Govind Rama ...	... 3rd "	Do.	35	"	Right Inguinal. Lt. Inguinal	20 "	"	"	Death in 5 hours ...	...	3rd "
21	3923	Daji Dhondi ...	... 3rd "	Do.	28	"	Left Femoral ...	40 "	"	"	Pelivrium. Death cardiac failure	...	5th "
22	3934	Luximan Yessoo ...	... 3rd "	Do.	25	"	Right Inguinal. Rt. Parotid...	100 "	"	"	Bubo infiltrating and spreading deep into pelvis. Death on 12th day from exhaustion.	...	14th "
23	3937	Jaya Govinda ...	... 4th "	Do.	14	F.	Right Femoral ...	5 "	"	"	Death in 3 hours ...	...	4th "
24	3941	Gokal Kisonbhai ...	... 4th "	Do.	32	M.	Right Femoral ...	20 "	"	"	Death in 23 hours ...	...	5th "
25	3944	Shivratnan Ramjeevan ...	... 5th "	Do.	30	"	Left Inguinal ...	50 "	"	"	Gradual cardiac failure ...	...	8th "
26	3950	L. M. Gonsalves ...	... 5th "	Christian	18	"	Right Femoral ...	5 "	"	"	Death in 3 hours ...	...	5th "
27	3956	Sabarot Tulsee ...	... 6th "	Hindu	40	"	Left Axilla ...	30 "	"	"	Sudden cardiac failure ...	...	7th "
28	3966	Sakharam Mahadoo ...	... 7th "	Do.	30	"	Left Femoral ...	30 "	"	"	Septicemic temperature, sudden cardiac failure.	...	9th "
29	3980	Dhondi Punaji ...	... 8th "	Do.	25	"	Right Femoral ...	20 "	"	"	Delirium. Secondary pneumonia.	...	10th "
30	3984	Xavier Fernandes ...	... 8th "	Christian	35	"	Right Inguinal...	20 "	"	"	Secondary pneumonia, hæmoptysis, death in 24 hours.	...	9th "
31	3986	Chandree ...	... 9th "	Hindu	8	F.	Left Axilla ...	10 "	"	"	Death in 7 1/2 hours...	...	9th "
32	3997	Haree Dewji ...	... 9th "	Do.	25	M.	Left Femoral ...	30 "	"	"	Delirium, cardiac failure ...	...	10th "
33	4001	Gopala Sona ...	... 10th "	Do.	40	"	Left Axilla ...	10 "	"	"	Death in 3 hours ...	...	10th "
34	4007	M. R. De'Silva...	... 10th "	Christian	10	"	Left Femoral ...	10 "	"	"	Semi-unconscious. Death in 14 hours	...	11th "
35	4011	Bajrath Manchand ...	... 11th "	Hindu	40	"	Left Femoral ...	90 "	"	"	Bubo incised ...	21st March 1900.	...
36	4015	Pardoo Ganesham ...	... 11th "	Do.	30	"	Left Axilla ...	20 "	"	"	Death in 18 hours	...	12th Feb. 1900.
37	4019	Dula Gumaji ...	... 11th "	Do.	35	"	Right Inguinal...	40 "	"	"	Vomiting, delirium, cardiac failure.	...	12th "
38	4025	Yelloo Rasu ...	... 12th "	Do.	30	"	Right Femoral ...	50 "	"	"	Bubo subsided ...	3rd March 1900.	...
39	4027	Kondilbai Badoo ...	... 12th "	Do.	20	F.	Right Femoral ...	10 "	"	"	Bubo, extending into pelvis. Death in 11 hours.	...	12th Feb. 1900.
40	4029	Bala Hanra ...	... 12th "	Do.	13	M.	Left Femoral ...	10 "	"	"	Death in 3 hour ...	...	12th "
41	4032	Wala Narsing ...	... 12th "	Do.	30	"	Left Axilla ...	50 "	"	"	Secondary pneumonia ...	...	16th "
42	4052	Sabaji Ladooba...	... 15th "	Do.	35	"	Right Femoral ...	5 "	"	"	Death in 5 hours ...	...	16th "
43	4059	Luxaman Mhasoo ...	... 15th "	Do.	25	"	Left Axilla ...	30 "	"	"	Infiltration extending ...	...	17th "
44	4070	Kasiram ...	... 16th "	Do.	22	"	Rt. Submaxillary. Lt. Submaxillary.	20 "	"	"	Semi-unconscious. Enormous swelling of face.	...	17th "

45	4/84	Bheema Yadoo ...	...	... 17th Feb.	1900	Do.	...	25	F.	Right Axilla	...	...	...	10	"	"	"	"	Death in 1½ hours...	...	...	...	17th "
46	4086	De Souza...	...	... 17th "	"	Christian	...	60	M.	Left Femoral	...	...	...	30	"	"	"	"	Death in 24 hours...	...	...	...	18th "
47	4088	Arjoon Baya	...	... 17th "	"	Hindu	...	30	"	Right Femoral	...	...	...	70	"	"	"	"	Both buboes subsided	...	...	...	6th April 1900.
48	4097	Tuka Bhowana...	...	... 19th "	"	Do.	...	40	"	Left Inguinal	...	...	...	40	"	"	"	"	Bubo suppurated	...	...	...	9th March 1900.
49	5002	Pandoo Vithoo	...	... 19th "	"	Do.	...	35	"	Right Femoral	...	...	...	40	"	"	"	"	Delirium. Secondary pneumonia.	...	...	...	21st Feb. 1900.
50	5005	Rama Govinda	...	... 20th "	"	Do.	...	16	"	Right Axilla	...	...	...	20	"	"	"	"	Death in 22 hours...	...	...	...	21st "
51	5010	Karia Ratna	...	... 20th "	"	Do.	...	20	"	Left Axilla	...	...	...	20	"	"	"	"	Death in 8 hours	...	...	...	21st "
52	5014	Vishram Nathoo	...	... 20th "	"	Do.	...	45	"	Left Femoral	...	...	...	140	"	"	"	"	Delirium, diffused bubo, general tremulousness.	...	...	...	27th "
53	5016	Govind Sadoo	...	... 21st "	"	Do.	...	23	"	Right Femoral	...	...	...	60	"	"	"	"	Delirium. Secondary pneumonia.	...	...	...	23rd "
54	5031	Dadoo Taty	...	... 22nd "	"	Do.	...	10	"	Left Femoral	...	...	...	40	"	"	"	"	Death in 16 hours	...	...	...	23rd "
55	5043	Ravji Gainoo	...	... 23rd "	"	Do.	...	36	"	Right Inguinal	...	...	...	40	"	"	"	"	Death in 16 hours	...	...	...	24th "
56	5050	Nagibai Dhondoo	...	... 23rd "	"	Do.	...	5	F.	Left Cervical	...	...	...	20	"	"	"	"	Convulsions. Death in 24 hours.	...	...	...	24th "
57	5052	Diogo Rodrigues	...	... 23rd "	"	Christian	...	18	M.	Left Inguinal	...	...	...	80	"	"	"	"	Death in 18 hours	...	...	...	24th "
58	5058	Harilal Kanji	...	... 24th "	"	Hindu	...	25	"	Left Femoral	...	...	...	40	"	"	"	"	Death in 5 hours	...	...	...	24th "
59	5060	Daji Amrita	...	... 24th "	"	Do.	...	20	"	Left Inguinal	...	...	...	160	"	"	"	"	Bubo incised	...	...	...	28th April 1900.
60	5062	Luximan Dewji	...	... 25th "	"	Do.	...	20	"	Right Inguinal	...	...	...	170	"	"	"	"	Died of exhaustion. A prolonged case.	...	...	...	31st March 1900.
61	5069	Rama Gaboo	...	... 25th "	"	Do.	...	28	"	Left Femoral	...	...	...	80	"	"	"	"	Unconscious	...	...	...	27th February 1900.
62	5072	Minguel De Costa	...	... 26th "	"	Christian	...	24	"	Right Inguinal	...	...	...	75	"	"	"	"	Bubo diffused	...	...	...	28th "
63	5081	Bhagwati Deviram	...	... 27th "	"	Hindu	...	22	F.	Left Inguinal	...	...	...	55	"	"	"	"	Death in 8 hours	...	...	...	27th "
64	5083	Jacky Cardozo	...	... 27th "	"	Christian	...	40	M.	Right Inguinal	...	...	...	95	"	"	"	"	Bubo subsided	...	...	...	6th April 1900.
65	5085	Dhaktya Rajkaji	...	... 27th "	"	Hindu	...	30	"	Left Inguinal	...	...	...	115	"	"	"	"	Delirium. Death on the 5th day from exhaustion.	...	...	...	8rd March 1900.
66	5087	Ramma Bapoo	...	... 27th "	"	Do.	...	20	"	Left Axilla	...	...	...	75	"	"	"	"	Sudden collapse day after admission. Secondary pneumonia.	...	...	...	2nd "

D. A. TURKHUDD, M.B., C.M. (Edin.),
Chief Medical Officer, Modikhana Hospital.

Parsee Fever Hospital.

I have the honour to forward the following report on the working of the Parsee Fever Hospital for the twelve months ending 31st May 1900.

The hospital continued its work on the same principles as described in the last report from 1st June to 10th July 1899. As the number of admissions had dwindled down almost to nothing, the Hospital Committee decided to close the hospital from 10th July 1899 and thus reduce the rather heavy expenditure.

In August 1899 the Hospital Committee offered me the post of Physician to the hospital, which I accepted. The hospital was re-opened on 15th January 1900 and continued open till the end of the year under review.

The hospital is supported by voluntary contributions from Parsees, collected by the Trustees of the Parsee Punchayat. The management of the hospital is vested in a Committee of the following gentlemen, the first five of whom are the Trustees of the Parsee Punchayat :—

Sir Jamsetji Jeejibhoy, Bart.
 Sir Dinshaw M. Petit, Bart.
 Hormusji Edalji Allbless, Esq.
 Jamsetji Cursetji Jamsetji, Esq.
 Merwanji Muncherji Cama, Esq., B.A.
 Sir Jehangir Cowasji Jehangir, Kt.
 Jamestji N. Tata, Esq.
 Jehangir B. Murzban, Esq.
 Khan Bahadur Darasha R. Chichgar.
 Jeejibhoy Framji Petit, Esq.
 Rutonji Bomanji Dnbash, Esq.
 Khan Bahadur N. H. Choksy, L. M. & S.
 Sorab K. Nariman, Esq., M.D.
 Shamsul-Ulma Jewanji J. Modi, B.A.

The following is the list of medical and nursing staff—

Physician—Sorab K. Nariman, Esq., M.D., B. Sc. (Bombay),
 M. R. C. S. (England), D. P. H. (Cambr.)
 House-Surgeon.—S. P. Mistri.
 „ R. A. Contractor.
 Nurse—M. McFerran.
 „ Pirojbaï Bhajiwala.
 „ A. Lowden.
 „ Navajbai Vacha.
 „ Hirabhai Parakh.
 Manager—Merwanji Udwadia.
 Dispenser—F. Coelho.

and 1 muccadam, 6 ward boys, 5 ayahs, 2 cooks, 2 ramosis, 1 dhobi, 1 mali, 2 coachmen and 2 sweepers.

For small-pox cases there was a separate staff of one nurse and 2 ward boys.

The hospital is located on Parel Road near the Victoria Gardens in the commodious bungalow of Messrs. Merwanji and Hormusji Muncherji Cama. This bungalow has been kindly lent free of charge, and is admirably suited for isolation hospital purposes. There are nine wards to accommodate 50 patients, giving about

120 square feet and 1,400 cubic feet to each patient. The hospital building is over 60 feet away from the main road and from any adjacent house. The hospital has a nice garden and open space all round. There is separate accommodation for house-surgeons, nurses and servants. Special provision in the form of a couple of tents pitched on the hospital grounds was made for small-pox cases.

There are no contact sheds in the hospital compound, but provision is made on the Connaught Road opposite by putting up temporary sheds for about 20 families.

Haffkinism and Vaccination.—None of the hospital staff volunteered to get inoculated with Haffkine's prophylactic serum, though special inducement in money and necessary rest were offered, whereas when the first small-pox case was admitted, every member of the staff got vaccinated of their own accord.

Use of the Hospital.—In previous years the hospital was used for many other diseases besides plague; this year the system was changed, and only plague cases and those likely to develop plague (suspicious cases) were admitted, as, in my opinion, it is not safe to treat other diseases accompanied with fever in or near the plague wards. The observation cases, if they did not develop plague, were discharged within a few days from admission. During the small-pox epidemic, small-pox cases were admitted and kept away from the plague wards with a separate staff of nurse and attendants.

Conservancy.—All the ejecta of patients were passed in bed-pans, bottles or commodes, and were mixed with disinfectants (mercuric chloride and tartaric acid solution 1 in 1,000) before being passed to Bhungies for final disposal, *viz.*, carting away to Municipal depôt.

Disinfection.—All much-soiled clothes as well as dressing were destroyed by fire. Other used clothes were steeped in a large wooden tub containing perchloride of mercury and tartaric acid solution (1 in 3,000) for over an hour before being passed to dhobi for washing. Blankets, sheets, bed-covers, &c., were sent every week for disinfection in the steam disinfector at the Arthur Road Hospital.

The floor of the wards was washed once a week with solution of permanganate of potash and sulphuric acid (1 in 1,000). The walls and ceilings were flushed with perchloride of mercury acid solution once a fortnight. Lime washing was never done, as it was likely to counteract the effects of the acidified disinfectants, and further as it might form a favourable nidus for the breeding of plague-germs.

Ozone was generated in the wards morning and evening to purify the air.

Inoculated cases.—Two plague cases were inoculated with Prof. Haffkine's prophylactic within the previous six months, of whom one died and one recovered :—

(a) Pirojsha Jamestji Rogers, male, aged 12, inoculated in November 1899, admitted for plague on 19th January 1900, and recovered; (b) Namdar Kaikhosru, Irani, male, aged 36, inoculated twice in 1899 (last in October 1899), admitted for plague on 25th February 1900, and died.

Sickness and Mortality among Staff.—There was no plague among the staff, nor any other infectious disease. The servants (wards boys, ayahs, &c.) lived in the same quarters, where plague had made a havoc last year (10 cases and 6 deaths). The precautions taken before the occupation of these quarters were—(a) a few tiles were removed from the roof; (b) the floor was dug out and a few inches of earth removed and replaced by fresh earth rammed in with a large quantity of strong permanganate of potash and sulphuric acid solution; (c) the walls, inside of roof, and partitions were well flushed with acidified corrosive sublimate solution; and (d) the servants were provided with cots so as to prevent them sleeping on the floor.

TABLE I.—*Total Admissions during the year.*

Months.						Plague.	Small-pox.	Observation cases including all general diseases.	Total.
June	1899	...	...	...	...	3	Nil.	2	5
July	,,	...	...	...	...	Nil.	,,	Nil.	Nil.
January	1900	...	...	...	...	19	,,	1	20
February	,,	...	...	...	...	28	2	1	31
March	,,	...	...	...	...	37	1	1	39
April	,,	...	...	...	...	40	1	2	43
May	,,	...	...	...	...	13	1	3	17
Total						140	5	10	155

The largest number of weekly admissions was 20 in the first week of April and the largest number of daily admissions was 4 on 7th April.

The total number of deaths during the year was 93, of which 89 were plague deaths. The largest number of deaths during any particular day was 4 on 9th April.

TABLE II.

						Admissions.	Deaths.	Recoveries.	Percentage of Mortality.
Plague	...	...	...	...	...	140	89	51	63.5
Small-pox	...	...	...	...	...	5	1	4	20
Observation Cases	...	...	...	...	...	10	3	7	30
Total						155	93	62	60

TABLE III.—*Plague.*

Months.						Total Admissions.	Died within 24 hours.	Died within 48 hours.	Total deaths.	Total recoveries.	Percentage of Deaths.
June	1899	...	...	..	...	3	Nil.	Nil.	2	1	66.6
July	,,	...	...	...	...	Nil.	,,	,,	Nil.	Nil.	Nil.
January	1900	...	...	...	...	19	3	3	9	10	47.3
February	,,	...	...	...	...	28	4	7	15	13	53.5
March	,,	...	...	...	...	37	7	8	28	9	75.6
April	,,	...	...	...	...	40	6	11	28	12	70
May	,,	...	...	...	...	13	1	2	7	6	53.8

TABLE IV.—*Plague.*

	Total Admissions.	Deaths.	Recoveries.	Percentage of Deaths.
Males	54	36	18	66·6
Females	57	39	18	68·4
Children under 12	29	14	15	48·2

TABLE V.—*Mortality among sexes.*

Total mortality for the year.	Mortality amongst men.	Mortality amongst women.	Mortality amongst children under 12.
93	39	39	15

TABLE V(A).—*Percentage of Mortality amongst the following Ages.*

No.	Age.	Percentage of Mortality.	No.	Age.	Percentage of Mortality.
1	Up to 1 year	Nil.	4	20 years to 30 years ...	63·1
2	1 year to 10 years ...	41·6	5	30 „ „ 40 „ ...	68·1
3	10 years to 20 years ...	62·5	6	40 „ and upwards ...	81·4

TABLE VI.—*Situation of Buboes.*

Situation.	Total cases.	Males.	Females.	Mortality.	Recoveries.	Percentage of Mortality.
Cervical	11	5	6	6	5	54·5
Parotid ... ..	...	...	...	...	...	...
Right Axillary	11	5	6	8	3	72·7
Left Axillary	6	4	2	3	3	50
Right Femoral	21	13	8	12	9	57
Left Femoral... ..	26	14	12	15	11	57·7
Right Inguinal	21	9	12	14	7	66·6
Left Inguinal	26	10	16	17	9	65·3
Other Situations ... ..	...	...	...	...	...	...
No Buboes	4	1	3	4	0	100
Multiple Buboes	14*	7	7	10	4	71·4

* Of the multiple buboes—(a) one case had three, left inguinal, right pectoral and left submammary; (b) one case had six, both inguinal, both axillary and both cervical; (c) one case had three, left femoral and both cervical.

As for pneumonic plague, two cases, one male and one female, showed signs of pneumonia without any buboes ; both died. Both were entered as pneumonic plague, although no bacteriological examination was made.

One plague case, a male, with inguinal bubo, developed secondary pneumonia and was cured.

Important Observations.

1. This year (1900) there were fewer plague admissions than at the same period in 1899, and the percentage of mortality was higher. The fewer admissions can be accounted for by the lesser incidence of plague among the Parsis to a certain extent, and by the greater freedom allowed in the present regulations for the treatment of plague patients in their own houses. The greater mortality is due to increased virulence of the disease, and to the fact that ordinary fever cases, likely to get infected with plague in the hospital, were not admitted.

2. *Incubation.*—In cases where the nature and exact time of infection are known, such as the infection from cuts, falls, cleansing of a godown or out-house where dead rats are found, handling of dead rats, &c., I have noticed that where the incubation period is less than 48 hours, the cases invariably prove fatal, and where the incubation period is long, from 5 to 7 days, the chances of recovery are very great.

3. *Delay is dangerous.*—On eleven different occasions our ambulance, which was telephoned for to fetch plague cases, had to return without the patient, the relations of the patient sending one excuse or the other for giving us unnecessary trouble. Of these eleven, nine patients were eventually brought to the hospital mostly in hack-gharries after an interval of from 12 to 48 hours. Of these nine eight died and one recovered, whereas had they been brought in our ambulance at the time, the probabilities are that one or two more lives would have been saved.

4. *Two or more cases from the same house.*—When several cases were admitted from one house, as a rule the first cases recovered and the subsequent ones died. This fact emphatically demonstrates that in the infected house disease gets more and more virulent every hour, and that the real safety, therefore, lies in the immediate evacuation of the place.

5. *Living directly under open tiled roof.*—Of the 140 plague admissions, 35 cases had come from garrets, 31 from ground-floor, and the remaining 74 from upper floors ; of those coming from the ground and upper floors, 21 used to sleep either under lofts or staircases. The greater incidence of plague on the ground floor can be attributed to dampness, darkness, and deficiency of ventilation in addition to infection carried by rats. In case of attics, however, the chief source of infection is the dust and dirt falling from the roofs, which are infested with rats, for, even in fairly well ventilated attics, the number of plague attacks is proportionately much greater. As the greatest incidence of plague is, in my opinion, in rooms directly under roof, I believe we will win a great battle against plague by making the roofs water-tight and air-tight wherever possible. In case of large tenement houses, such as those in which most of the Parsis live, this can be practically effected at a little cost.

6. *Treatment of buboes.*—At first I used to treat buboes with ice application. No doubt the ice relieved the pain, but the great drawbacks noticed were that it caused sloughing of the subcutaneous structures and that it did not prevent the buboes from spreading. In place of ice, therefore, various applications were tried, and after repeated failures of one application or the other, I found a paste of guaiacol, extract of belladonna, and camphor answer the purpose best. The paste is made by

macerating on a curry stone half a dram of guaiacol, 10 grains of camphor, half a dram of extract of belladonna, one ounce of *esus* (incense), with a sufficiency of tincture iodine. This paste, thickly applied with cotton wool on the top, sticks well on the bubo and binds the part firmly, thus preventing the spread of the bubo. It also relieves the pain. If the bubo suppurates and is opened, no sloughing is noticed in the wound, and the wound heals quickly.

7. *Complications of plague.*—In four cases orchitis and epididymitis were observed either during the acute or convalescent period. In all four the buboes were inguinal, and in every case the first attack of orchitis and epididymitis occurred on the side opposite to the bubo. In two cases the other side was affected later on. One case proved fatal and three recovered. Among the recovered cases, one orchitis suppurated.

8. *Lustig serum.*—Six cases were treated with Prof. Lustig's serum, of whom 4 died and 2 recovered. Eight cases were treated at the same time with ordinary methods, of whom 6 died and 2 recovered. My experience is too limited to express any opinion about the serum method of treatment, but I am inclined to believe that serum treatment tends to prolong the life and thereby give the patient more chances of recovery.

No. 5.

Report of the Bene-Israel Plague Hospital from 1st June 1899 to 31st May 1900.

The Hospital is a communal one open to Jews of all denominations: Bene-Israelites, Bagdadi, Yemeni, and Cochin Jews. It was opened on the 23rd February 1898 and kept working since then. No new donations were received during the year under report excepting Rs. 150-9-0 from Mr. Bischoffsheim, London.

Committee.

Mr. David Aaron	...	...	...	President.
Mr. Abraham Daniel	...	...	...	Vice-President.
Mr. Elijah Solomon	...	...	...	Treasurer.
Khan Sahib David Solomon	...	...	...	Honorary Secretary.

Medical Staff.

Dr. J. B. De Quadros, L.R.C.P., L.R.C.S., &c.,

Chief Medical Officer, up to 15th March 1900.

Dr. P. M. Matthai, M.D., L.R.C.P. & S., L.F.P. & S., L.M. & S.,

Chief Medical Officer, from the 15th May 1900.

Mr. S. Shewaji Resident Hospital Assistant.

Staff.

1 Nurse.	1 Hamal.
2 Ayahs.	1 Malee.
1 Cook.	2 Halalcores.
1 Ward Boy.	1 Ramosee.

Khan Sahib David Solomon, Honorary Secretary, Mr. Elijah Solomon, B.A., Honorary Treasurer, Messrs. Benjamin Samson, Abraham Solomon and Samuel S. Mazgavkar, members of the Executive Committee, visited the Hospital almost every day and looked after the needs and convenience of the persons in the Hospital compound which, in June 1899 and in March and April 1900, was filled to the utmost.

Building.

The Hospital building is situated at Connaught Road, Byculla. There are fourteen blocks occupying an area of an acre of Municipal ground which has been given to the Hospital by the kind Municipal Commissioner, to whom the thanks of the Committee are due.

The blocks comprising the Hospital are as follows :—

- | | | | | | |
|--|-----|-----|-----|-----|--|
| 1. Acute Ward | ... | ... | ... | ... | 1 block divided into two wards,
one for the males and the
other for the females. |
| 2. Convalescent Ward | ... | ... | ... | ... | 1 block as above, |
| 3. Observation Ward | ... | ... | ... | ... | 1 block as above. |
| 4. Mortuary | ... | ... | ... | ... | 2 rooms. |
| 5. Dispensary & Hospital Asstt. Quarters | | | | | 1 block with 3 rooms. |
| 6. Servants' Quarters | ... | ... | ... | ... | 2 blocks with 7 rooms. |
| 7. Office | ... | ... | ... | ... | 1 block. |
| 8. Contacts and Segregation Sheds | | | | ... | 5 blocks with 30 rooms. |
| 9. Latrines | ... | ... | ... | ... | 2 blocks with 6 seats. |

It is noteworthy that many who accommodated themselves in the segregation camp found themselves so comfortably lodged that they stayed for months and would not go back till they were forced.

Latrines.—The latrines consist of two blocks, one for the Hospital and the other for contacts. There are 6 seats. It is treated twice a day with 15 per cent. carbolic powder. There is strict supervision over it of a Municipal Health Inspector.

Pipes.—Two stand-pipes are provided in the Hospital compound, one for the sick and one for contacts. The waste water is conveyed to the immediate main drain on the northern side.

Disinfectants.—The wards are treated twice daily with a solution of perchloride of mercury 1—1000 and washed weekly with chloride of lime 5 per cent. Solution of carbolic acid is used for general purposes, such as washing hands, &c., so also phenol solution and carbolic powder 15 per cent. is used for disinfecting latrines and ground surrounding the wards.

Mortuary.—As soon as death occurs the body is removed to the mortuary which is situated on the east side. After performing religious ceremonies the body being dressed in new clothes is removed as early as possible to the burial ground by contacts who are segregated for 12 days.

Funeral expenses of paupers are defrayed from the hospital funds,

A solution of perchloride of mercury is sprinkled in the morning, and phenyle in the evening daily on the ground floors of the wards, and all the floors are lime-washed every tenth day. All the floors of the wards are scraped every month and dirt burnt; new earth being placed and the floors are linewashed.

No clothings are sent to the steam-disinfector, but care is taken to saturate all cloths, blankets, sheets, &c., with 1 per cent. solution of perchloride of mercury, then exposed to sun till dry and subsequently washed by the Halalcure, and when dry are given to the dhobi for rewashing. Rags, hospital dressings, patients' clothes and clothes considered to be dirty are destroyed by fire. Even amongst the contacts and persons in the health camps, great care is taken to strictly enforce this rule.

Inoculation.—There were 6 persons inoculated with Haffkine's serum admitted into the hospital; full particulars are given below :—

- (a) Ezekiel Samson, male, 27 years, carpenter, living at Chinchpooogli in the Jewish burial ground. Inoculated on 9th October, was attacked

on 28th December 1899, and admitted into the hospital on 30th December, with a bubo in right axilla. Type of the disease—common.—*Cured*.

- (b) Sarabai Ephraim, female, age 30 years, living in 9-29, Jail Road, South. Inoculated in October or November; sent by the S. M. O., Umarkhady, who took charge of the inoculation certificate, in a dying and unconscious condition. She had bubo in left groin; not known when attacked; was admitted on 26th February 1900. Died within 9 hours. Type of disease—virulent.—*Died*.
- (c) Samson Sucojee, male, 28 years, an employé in a printing press, living at DeLisle Road. Inoculated in November; certificate was, his wife said, taken charge of by S. M. O. who sent him to the hospital. She said he was inoculated in Umarkhady; attacked on 6th February and was admitted into the hospital on 9th; very unconscious and restless. Bubo in the right groin. Died within 36 hours. Disease—very virulent.—*Died*.
- (d) Moses Samuel, male, 35 years, carpenter, living in Israel Mohalla. Inoculated twice in October; admitted into the hospital from a house in which there was a death from plague on 9th February, with high fever; turned out to be a case of bronchitis.—*Cured*.
- (e) Abraham Isaac, male, 13 years, student, living in 4, Umarkhady Street; caught infection in Dongri Street, from which two other patients, not inoculated, were admitted. He was attacked on 6th March 1900; was admitted into the hospital on 10th March; bubo in left groin; was inoculated in October by Dr. J. B. De Quadros. Inoculation certificate taken charge of by S. M. O., Umarkhady. Type of disease—mild.—*Cured*.
- (f) Jacob Benjamin, male, 35 years, carpenter, Israel Moholla. Inoculated on 8th October 1899; attacked on 12th March 1900; bubo in right groin; admitted on 13th March 1900; when admitted, he was unconscious and restless. Type of disease was virulent.—*Cured*.

Inoculation certificates were taken charge of by S. M. Officers, as relief was given to the patients (Rs. 2 per head).

There were no cases treated by Professor Lustig's curative serum.

TABLE I.
Total Admissions during the year.

Months.				Plague.	Relapsing fever.	Observation cases, including all general diseases.	Total.
June	1899	...	...	8	.....	1	9
July	"	...	...	4	.....	.....	4
August	"	...	...	1	.....	1	2
September	"	...	...	2	.....	.....	2
October	"	...	...	1	.....	1	2
November	"	...	...	2	.....	.....	2
December	"	...	...	2	.....	2	4
January	1900	...	...	1	.....	2	3
February	"	...	...	9	.....	2	11
March	"	...	...	21	.....	5	26
April	"	...	...	10	.....	2	12
May	"	...	...	1	.....	2	3
Total				62	.....	18	80

The largest daily number of admission was on the 26th March 1900, when 6 patients were admitted; and the largest number of admission was 9 during the week ending 28th March 1900.

The total number of deaths during the year was 27, and the total number of deaths from plague was 25. The largest number of deaths was 2 on 29th June 1899 and 2 on 8th April 1900.

TABLE II.

	Admissions.	Deaths.	Recoveries.	Percentage of Mortality.
Plague	62	25	37	40·3
Relapsing Fever ... ..	.....	.....	.....	.....
Observation and other diseases ...	18	2	16	11·1
Total ...	80	27	53	33·7

TABLE III.—*Plague.*

Months.	Total admissions.	Died within 24 hours.	Died within 48 hours.	Total deaths.	Total Recoveries.	Percentage of deaths.
June 1899... ..	8	1	2	5	3	62·5
July „	4	3	.....	3	1	75
August „	1	.....	.....	.....	1	.....
September „	2	.....	.....	.....	2	.....
October „	1	1	.....	1	.....	100
November „	2	1	.....	1	1	50
December „	2	1	.....	1	1	50
January 1900	1	.....	.....	.....	1	.....
February „	9	2	1	4	5	44·4
March „	21	3	1	6	15	28·5
April „	10	3	1	4	6	40
May „	1	.....	.....	.....	1	.....

TABLE IV.

Jews.

	Total admissions.	Deaths.	Recoveries.	Percentage of deaths.
Males	31	10	21	32·2
Females	17	9	8	52·9
Children under 12 years	13	5	8	38·4

Hindoos.

					Total admissions.	Deaths.	Recoveries.	Percentage of deaths.
Males	...	...	...	...	1	1	.....	100

TABLE V.

Showing the Mortality for the Year amongst Sexes and Children.

Total mortality for the year.	Mortality amongst men.	Mortality amongst women.	Mortality amongst children (all under 12 years of age).
25	11	9	5

TABLE V(A).—*Percentage of Mortality amongst the following Ages.*

No.	Ages.	Admissions.	Deaths.	Percentage of mortality.
1	Up to 1 year ... ..	.....	.....	.....
2	1 years to 10 year	13	6	46·1
3	10 years to 20 „	18	5	27·7
4	20 „ 30 „	6	7	43·7
5	30 „ 40 „	5	2	40
6	40 „ and upwards	10	5	50

TABLE VI.

Table showing the Situation of Buboes.

Situation.	Total No. of cases.	Males.	Females.	Mortality.	Recoveries.	Percentage of Mortality.
Cervical	2	2	.....	.....	2	.....
Parotid	5	3	2	2	3	40
Right axillary	8	5	3	4	4	50
Left axillary	5	4	1	2	3	40
Right femoral	1	.....	1	.....	1	.....
Left femoral ... ..	.....	.....	.....	.....	.....	.....
Right inguinal	13	7	6	7	6	53·8
Left inguinal... ..	18	9	9	8	10	44·4
Other situations*	1	.....	1	.....	1	.....
No buboes	1	1	.....	.....	1	.....
Multiple buboes	8	7	1	1	7	12·5

* Bubo was on the arms.

TABLE VII.—*Showing Pneumonic Plague (without Buboes).*

					Admitted.	Died.	Recovered.	Percentage of mortality.
Males	...	...	...	...	1	.....	1	.....

TABLE VIII.—*Showing cases of secondary Plague Pneumonia
(complicated with Buboes).*

	Admitted.	Died.	Recovered.	Percentage of mortality.
Females	1	.....	1	.....

Pneumonia supervened on the fifth day.

Sickness and Mortality among the Staff of the Hospital.—There is no case to be recorded among the staff all throughout the year, except that of the Senior Medical Officer who died in March after a sickness of 6 days without developing any definite symptoms of plague. He was well and attended to his duty till the evening of the 12th March. On Tuesday he felt a little out of sorts, and as he used to do in such simple ailments, he took an opening dose early next morning. Towards the evening he noticed the temperature a little high. Next day he began to feel worse and the temperature was 102 in the morning and 105 towards the evening. This was kept up all through Friday. No definite symptoms of bubonic or pneumonic plague could be discovered. He was conscious till Saturday morning when failure of heart set in and the patient passed away at 4 a.m.

P. M. MATTHAI,
M. D., L. R. C. P. & S., L. F. P. & S., & L. M. & S.,
Chief Medical Officer,
Beni-Israel Plague Hospital.

No. 6.

Report on the Sunni Mahomedan Hospital,
Ripon Road, Bombay.

I have the honor in forwarding the Annual Report of the Sunni Mahomedan Hospital to make the following remarks, which may be of interest:—

In my opinion the hospital is a very popular one amongst the poor class of the Mahomedans of Bombay. The number of admissions to the hospital has increased since last year and a large number of patients helped in the way of out-door patients.

Mrs. Barr and the Hakim have between them done much good work ; both have won the confidence of these poor people by patient toil and kind attention.

Sirdar Umar Jumaal makes a small present to every patient before leaving the hospital as cured, officiates and prepares at coremonial visits and inspections of the Hospital, decorating and making such visits interesting to all attending them. Khan Bahader Abdur Razzak has been the daily worker and regular visitor to the hospital, and a good deal of the popularity of the Hospital is due to his work.

I wish to draw attention to his work here as willingly tendered and done as in the early days of plague when he was found so invaluable. He is one of the very few volunteers that still continue to really work, and such work as demands that it should meet with our consideration and approbation.

H. E. PRITCHARD, CAPT.,
District Officer,
Central District.

1. Report on the Sunni Mahomedan Plague Hospital, Ripon Road, Bombay, from 10th April 1897.

Medical Staff—1	Hakim.	1	Visiting Medical Officer.
	1 Nurse.	1	Compounder.
	6 Ward boys.	3	Ayahs.
	2 Sweepers.	2	Sweeper women.
	2		Cooks.

The building consists of two wards for plague (1 for men and 1 for women) and two fever wards (1 for men and 1 for women); each ward to hold twenty patients; each ward 48' \times 28'. The dispensary is a room about 9' \times 12', a portion of which is the office. No servants' quarters except four rooms for sweepers, two store rooms and 11 out-houses, each 12' \times 12'; these are used for the patients when all the wards are full.

4 contact sheds, of which two fell down and two are uninhabitable.

6 latrines, 4' \times 4', 3 for men and 3 for women. These are washed out daily with perchloride of mercury and then carbolic powder is thrown in. The sewage is taken away by the hospital sweepers to a pit in Agripala.

All the clothes are washed by the sweepers in disinfecting fluid and then given to the dhobi.

Water is supplied from taps in hospital compound.

The wards are disinfected with perchloride of lime and phenyle and lime-washed thrice weekly. The clothes were sent to the disinfector at Arthur Road and were kept there for 12 hours and we boil the clothes once a month in a solution of perchloride of mercury.

The dead are buried by the relatives, and the paupers are buried by the Municipal funds with Mahomedan rites. There are 2 mortuaries, 9' \times 9', one for men and one for women.

No deaths among the staff. Two sweepers and one dhobi got plague and recovered. One sweeper got small-pox a few days after recovery from plague, was sent to the Arthur Road Hospital, where he recovered. The two sweepers (men) lived in a street where plague had broken out; the sweepers must have contracted plague by coming in contact with the patients.

TABLE I.

Table of Admission during the Year.

Month.	Plague.	Relapsing fever.	Observation cases including all general cases.	Total.
June 1899	7	8	.....	15
July "	13	7	.....	20
August "	25	13	.....	38
September "	9	12	.....	21
October "	19	17	.....	36
November "	9	12	.....	21
December "	36	20	13	69
January 1900	43	30	7	80
February "	36	45	11	92
March "	67	51	6	124
April "	79	27	10	116
May "	19	13	15	47
Total ..	362	255	62	679

TABLE II.

	Admissions.	Deaths.	Recoveries.	Percentage of Mortality.
Plague	362	174	188	48·
Relapsing fever	255	83	172	32·
Observation and other diseases	62	.....	62	.. ..
Total ...	679	257	422	37·

TABLE III

Plague.

Month.	Total admissions.	Died within 24 hours.	Died within 48 hours.	Total deaths.	Total recoveries.	Percentage of deaths (Plague.)
June 1899	7	2	2	4	3	57
July „	13	5	.....	5	8	38
August „	25	9	5	14	11	56
September „	9	3	.....	3	6	33
October „	19	7	.....	7	12	36
November „	9	2	4	6	3	66
December „	36	13	4	17	19	47
January 1900	43	10	3	13	30	30
February „	36	8	6	14	22	38
March „	67	39	9	48	19	71
April „	79	24	11	35	44	44
May „	19	5	3	8	11	42

Relapsing Fever.

Month.	Total admissions	Died within 24 hours.	Died within 48 hours.	Total deaths.	Total recoveries.	Percentage of deaths (Fever).
June 1899	8	2	.....	2	6	25
July „	7	1	.....	1	6	14
August „	13	.....	1	1	12	7
September „	12	3	1	4	8	33
October „	15	2	3	5	10	33
November „	13	2	3	5	8	38
December „	23	8	2	10	13	43
January 1900	30	10	2	12	18	40
February „	25	6	3	9	16	36
March „	57	10	5	15	42	26
April „	32	5	7	12	20	37
May „	20	4	3	7	31	35

TABLE IV.

				Total admissions.	Deaths.	Recoveries.	Percentage of death.
Males	...	...	...	453	155	298	34
Females	...	...	...	188	85	103	45
Children	...	...	...	38	17	21	44

TABLE V.

Total Mortality for the year.	Mortality amongst Men.	Mortality amongst Women.	Mortality amongst Children (all under 12 years of age).
257	155	85	17

TABLE V (A).

Percentage of Mortality amongst the following Ages:—

No.	Years.	Total Admissions.	Total Deaths.	Total Recoveries.	Percentage of Mortality.
1	Up to 1 year ... ..	...	...	...	...
2	1 year to 10 years	97	15	82	15
3	10 years to 20 ,	148	78	70	52
4	20 „ to 30 „	163	91	72	55
5	30 „ to 40 „	155	46	109	29
6	40 „ and upward	116	27	89	23

TABLE VI.

Table showing the Situation of Buboes.

Situation.				Total No. of Cases.	Males.	Females.	Mortality.	Recoveries.	Percentage of Mortality.
Cervical	...	...	...	...	...	...	...	...	...
Parotid	...	...	...	17	12	5	12	5	70
Right axillary	...	...	...	44	33	11	29	15	66
Left axillary	...	...	...	31	20	11	24	7	77
Right femoral	...	...	...	...	...	...	...	...	...
Left femoral	...	...	...	...	...	...	...	...	...
Right inguinal	...	...	...	58	37	21	39	19	66
Left inguinal	...	...	...	61	48	13	38	23	62
Other situations	...	...	...	...	...	...	...	...	...
No buboes	...	...	...	...	...	...	...	...	...
Multiple buboes	...	...	...	151	131	20	113	38	78

TABLE VII.

Table showing Pneumonic Plague (without Buboes).

					Admitted.	Died.	Recovered.	Percentage of Mortality.
Males	...	...	...	...	9	5	4	55
Females	...	...	...	...	4	3	1	75
Children	...	...	...	...	2	2	.....	.....

TABLE VIII.

Table showing Cases of secondary Plague Pneumonia (complicated with Buboes).

					Admitted.	Died.	Recovered.	Percentage of Mortality.
Males
Females
Children

G. A. BARR,

Nurse in charge, Sunni Mahomedan Hospital.

No. 7.

Report of the Parel Sarvajanic Hospital, Bombay, for the year ending 31st May 1900.

The idea of erecting a temporary plague hospital for the benefit of the residents of the northern suburbs of the city, who for the most part are poor mill-operatives, originated with Captain Lewis, the late District Officer of F. and G. Wards, and it led to a meeting of the Volunteer Committees of F. and G. Wards at Government House, Parel, in October 1898 under the Chairmanship of Rao Bahadur Vasanji Khimji, J. P., when it was resolved to erect a private hospital in the Parel Government House compound by voluntary subscriptions from the public for the convenience of persons of all castes, creeds and conditions residing in the northern part of Island.

The necessary sanction for the erection of the hospital having been obtained, and subscriptions having come in freely, mainly through the efforts of Rao Bahadur Vasanji Khimji, the hospital sheds were erected in an excellent spot in Parel Government House compound, with the Hospital Assistant's quarters, dispensary office, and other necessary buildings.

Plague having subsided in the northern part of the Island, the Hospital was temporarily closed on 2nd June 1899. It was reopened for the admission of patients on the 15th January 1900, and closed on 15th May 1900.

The following is a list of the members of the Managing Committee of the Hospital :—

Rao Bahadur Vasanji Khimji, J.P.	...	...	Chairman.
The District Officer, F. and G. Wards...	...	...	Ex-officio Member.
Lakamsi Napoo, Esq., J.P.	...	...	Honorary Treasurer.
Mr. J. F. Madan	...	...	Honorary Secretary.
Khan Saheb Shaik Adam Yusufbhai	...	...	Member.
Dungersi Bhimji, Esq., J.P.	...	...	"
Rao Saheb A. N. Dalvi...	...	...	"
Mr. V. R. Luxmonjee	...	...	"
„ W. R. Jayaker	...	...	"
„ Rowji Raghunathjee	...	...	"
„ Adam Abba Patel	...	...	"

The staff of the Hospital during the year under report consisted of one hospital assistant, one lady nurse, one compounder, 4 ward boys, 2 ayahs, 2 sweepers, 1 dhobi, 1 cook, 1 peon and 2 ramosis. The Municipality supplied furniture, clothing, water, medicines, and disinfectants, while the Committee defrayed the expenses on account of provisions and other stores, and paid the wages of the staff, except the lady nurse whose services were kindly lent by Government, and the ramosis who were paid by the Municipality.

The patients were permitted to remain under the treatment of their own doctor or vaids, the hospital authorities providing food and all necessary things, but they scarcely took any advantage of this concession, as most of them were very poor. The hospital assistant was now and then assisted by the Sectional Medical Officer, and the warmest gratitude of the Committee is due to those Medical Officers under the Municipality who gave their advice as to treatment of patients, disinfection, etc., and to their Chairman, Rao Bahadur V. Khimji, for his untiring energy and labours in supervising the work of the hospital staff, which contributed to the success of the hospital to no small extent.

The Committee again takes this opportunity of tendering their hearty thanks to the Bombay Improvement Trust for the use of their ground free of charge, to the Government for the services of a lady nurse, to the Municipal authorities for the supply of stores, medicines and furniture, and to those gentlemen who have subscribed so freely and willingly to the hospital fund. The hospital sheds and other necessary buildings were all erected on the same site and on the same place as last year, and there was proper arrangement in every shed for ground and ridge ventilation. The partitions between the rooms in each shed were about 8 feet high. Separate cook-rooms were provided for all castes. But the most important feature of the hospital was the provision of a separate room for each patient, which, together with the principle of allowing two friends or relatives of patients to be always present, and of allowing others to visit them whenever they wished, had a very beneficial effect on the minds of the patients suffering from this fell disease.

There was one block of latrine made of corrugated iron, consisting of five seats. Two seats were reserved for women and three for men. The sewage was removed by sweepers in the ordinary way and emptied into a sewage cart placed on the outskirts of the Parel village. Under no circumstances were patients permitted to use the latrines used by the staff. They used bed-pans near their beds, and proper disinfection was carried out previous to disposal of the motions.

All clothes on being removed from the hospital were taken to the outer compound and placed in large tubs with a strong solution of carbolic acid. After being soaked for 24 hours they were laid or hung out in the sun, and then handed over to the Dhobi.

The water was laid on from the Vehar main by the Municipal Water Department.

The principal disinfectant used was carbolic powder which was plentifully sprinkled over all the floors in the hospital three times a day. The steam disinfectant was not used as it was too far off.

The mortuary was a small building containing 8 small rooms, each of which would hold a body. There were no doors to this building and plenty of ventilation was secured. The ground in the rooms and all round outside where the people prepared the bodies for disposal was kept well disinfected. The people were given disinfectants to wash in after handling the corpse. The dead were as a rule removed by their friends or relatives. Proper arrangements were made for the removal of the bodies of pauper patients—Hindu corpses by Hindus, Mahomedan corpses by Mahomedans, and Christian corpses by the Health Department.

Six patients were known to have been previously inoculated with Haffkine's serum. Of these 4 died and 2 recovered.

Details, as far as known, are given below :—

No.	Name.	Caste.	Age.	Sex.	Date of Inoculation.	Date of Attack.	Date of admission into hospital.	Date of death.	Date of discharge.
1	Kashi Durlath ...	Koli ...	30	F.	Not known	20-1-00	21-1-00	22-1-00	...
2	Dhondu Pillajee...	Mahratha	17	M.	Do. ...	22-2-00	26-2-00	27-2-00	...
3	Lilloo Essu ...	Do. ...	35	„	Do. ...	11-3-00	18-3-00	...	8-4-00
4	Babajee Rowjee ...	Mahar ...	50	„	13-12-99 ...	25-3-00	28-3-00	31-3-00	...
5	Kaloo Shirhar ...	Purdesi...	28	„	Not known	5-4-00	7-4-00	8-4-00	...
6	Vithu Mahadoo ...	Mahratha	35	„	Do. ...	10-4-00	15-4-00	...	24-4-00

There was only one case of plague among the hospital staff. The hospital assistant, Mr. Rupawalla, was attacked on 16th April 1900, and died on 8th May 1900. He was provided with a shed consisting of 3 rooms and bath-room on the confines of the hospital enclosure.

TABLE I.—*Total admissions during the year.*

Months.	Plague.	Relapsing fever.	Observation cases, including all general diseases.	Total.
15th January 1900 to 15th May 1900	310	9	29	348

Largest number of admissions was during the following weeks :—2nd April to 8th, 37 ; 9th April to 15th, 37.

On the 1st of March 1900 there were 11 admissions. The total number of deaths during the year was 235.

The total number of deaths from plague during the year was 222.

Total weekly deaths and percentage of deaths to admissions—herewith is attached a chart of weekly admissions and deaths.

Largest number of deaths on the 1st and the 4th of April was 8 respectively.

TABLE II.

	Admissions.	Deaths.	Recoveries.	Percentage of Mortality.
Plague	310	222	84	71·6 (4 transferred to other hospitals.)
Relapsing Fever...	9	3	5	33·3 (1 do.)
Observation and other Diseases ...	29	10	16	34·4 (3 do.)
Total ...	348	235	105	8

• 8 Transferred.

TABLE III (A.)—Relapsing Fever.

Months.	Total Admissions.	Died within 24 hours.	Died within 48 hours.	Total Deaths.	Total Recoveries.	Percentage of Deaths.
15th January to 15th May 1900	9	Nil	Nil	3	5	33·3

• 4 Transferred.

III (B).—Plague.

Months.	Total Admissions.	Died within 24 hours.	Died within 48 hours.	Total Deaths.	Total Recoveries.	Percentage of Deaths.
15th January to 15th May 1900	310	70	48	222	84	71·6

• 8 Transferred.

TABLE IV.

	Total Admissions.	Deaths.	Recoveries.	Percentage of Deaths.
Males	230	152	78 (of these 8 were sent to other hospitals.)	66·03
Females	77	57	20	74·02
Children under 12 years	41	26	15	63·4

TABLE V.—*Showing Mortality for the Year among Sexes and Children.*

Total mortality for the year.	Mortality amongst men.	Mortality amongst women.	Mortality amongst Children (under 12 years of age.)
235	152	57	26
	Total 235		

TABLE V (A.)—*Percentage Mortality amongst the following Ages.*

No.	Age.	Percentage of Mortality.	No.	Age.	Percentage of Mortality.
1	Up to 1 year ...	Nil.	4	20 years to 30 years ...	45· 9
2	1 year to 10 years ...	4· 2	5	30 „ „ 40 „ ...	18· 2
3	10 years to 20 „ ...	17· 4	6	40 „ and upwards ...	14·04

No. 8.

**Report on Adamjee Peerbhoy Borah Fever Hospital,
Queen's Road, Bombay.**

I beg to submit herewith the report of the Adamji Peerbhoy Borah Fever (or Plague) Hospital, situated on Queen's Road, Bombay, from the 1st June 1899 to the 31st May 1900.

The Hospital was never closed since it was opened in the month of March 1897.

The staff was the same as that of the last year.

There was no admission of a patient previously inoculated by Haffkine's serum,

There was no sickness or death in the staff of the Hospital.

TABLE I.

Total Admissions during the year.

Months.	Plague.	Relapsing fever.	Observation cases including all general diseases.	Total.
June 1899 ...	3	.....	.....	3
July „ ...	9	.....	6	15
August „ ...	7	.....	1	8
September „ ...	5	.....	.....	5
October „ ...	3	.....	.....	3
November „ ...	6	.....	.....	6
December „ ...	10	.....	2	12
January 1900 ...	13	.....	2	15
February „ ...	12	.....	2	14
March „ ...	19	.....	2	21
April „ ...	20	.....	2	22
May „ ...	7	.....	.....	7

The largest number of admissions during the week of March 1900 (from 25th to 31st) was 8 and on the particular day of 19th February 1900, it was 4.

The total number of deaths during the year was 71. The total number of deaths from plague was 68.

The percentage of deaths to admissions for the year was 54·19.

The largest number of deaths (on 28th March 1900) was 2.

TABLE II.

	Admissions.	Deaths.	Recoveries.	Percentage of Mortality.
Plague	114	68	46	59·64
Relapsing Fever ... ..	.....	.....	.....	.....
Observation and other diseases	17	3	14	17·64
Total ...	131	71	60	54·19

TABLE III.—*Plague.*

Months.	Total Admissions.	Died within 24 hours.	Died within 48 hours.	Total Deaths.	Total Recoveries.	Percentage of Deaths.
June 1899	3	2	.....	3	.....	.....
July „	9	2	.....	5	4	55·55
August „	7	1	.....	4	3	57·14
September „	5	2	.....	3	2	60
October „	3	1	1	2	1	66·66
November „	6	2	1	5	1	83·33
December „	10	2	1	5	5	50
January 1900	13	4	3	9	4	69·23
February „	12	4	2	9	3	75
March „	19	2	3	11	8	57·89
April „	20	6	1	9	11	45
May „	7	1	1	3	4	42·85

TABLE IV.—*For Borahs (Mahomedans).*

	Total Admissions.	Deaths.	Recoveries.	Percentage of Deaths.
Males	102	52	50	50·98
Females... ..	17	12	5	70·58
Children under 12 years	8	5	3	62·5

TABLE IV (A).—*For Hindoos.*

	Total Admissions.	Deaths.	Recoveries.	Percentage of Deaths.
Males	3	1	2	33·33
Females...	.....	.....	.....	.....
Children under 12 years	1	1	.....	100

TABLE V.—*Showing the Mortality for the Year amongst Sexes and Children.*

Total Mortality for the year.	Mortality amongst Men.	Mortality amongst Women.	Mortality amongst children (all under 12 years of age.)
71	53	12	6

TABLE V (A).—*Percentage of mortality amongst the following ages.*

Age.	Per cent.	Age.	Per cent.
Under 1 year ... ..	.....	20 years to 30 years	47·05
1 year to 10 years	71·42	30 „ „ 40 „	80·
10 years to 20 „	48·93	40 „ and upwards	71·42

TABLE VI.—*Showing the Situation of Buboes.*

Situation. *	Total Number of Cases.	Males.	Females.	Mortality.	Recoveries.	Percentage of Mortality.
Cervical	1	1	.....	1	.....	100
Parotid	4	3	1	2	2	50
Right axillary	12	10	2	7	5	58·33
Left axillary	9	7	2	6	3	66·66
Right femoral	17	15	2	12	5	70·58
Left femoral	23	17	6	10	13	43·47
Right inguinal	17	16	1	11	6	64·70
Left inguinal	21	18	3	9	12	42·85
* Other situations	1	1	.....	1	.....	100
No buboes	7	6	1	7	.....	100
Multiple buboes ... ..	.....	.....	.....	.....	.....	.....
Both axilla	1	1	.....	1	.....	100
Both parotids	1	1	.....	1	.....	100

* In the calf of the leg, left side, with boils on both legs.

No pneumonic plague case.

In conclusion, I beg to offer my best thanks to the District Officer, the Special Medical Officer and others for the interest they have taken in the Hospital matters.

D. R. KHOTE, B.A., L. M. & S.,
Medical Officer in charge.

H. H. Aga Khan's Plague Hospital for Khojas.

The Hospital was founded by the late lamented K. B. Mahomedbhoy Ebrahim on 26th April 1897 and up to the time of his untimely death, which took place on the 9th June 1899, all the expenses were borne by him. Immediately after his death, the management was taken by the Mahomedbhoy Ebrahim Testimonial Fund Committee, composed of the Hon'ble Fazulbhoy Visram (Chairman), Dr. Ismail Jan Mahomed, Messrs. Ebrahimbhoy Rehimtoola, Camaria Ismail Cassum, Abdoolabhoy Lalljee, Dostmahomed Peerbhoy, Allarakia Sewjee, Joomabhoy Janmahomed, Abdulla Allarakia, with F. M. Chinoy and M. H. Lalljee as Secretaries, and M. H. Lalljee as Treasurer. The management continued up to the 15th of December 1899, when the Hospital was transferred to His Highness Sir Sultan Mahomed Shah, K.C.I.E., by whom all the expenses are now borne. The Committee of Management consists of the Hon'ble Mr. Fazulbhoy Visram, Hon'ble Mr. Ebrahimbhoy Rehimtoola, Camaria Ismailbhoy Cassum, Messrs. Mahomedbhoy Hajeebhoy Lalljee and Joomabhoy Janmahomed.

During my absence on sick leave from the 16th of November 1899 to 12th January 1900, Dr. Dias acted for me. Mr. Shereali Ebrahim was the manager throughout the year. The Hospital staff consists of the Medical Officer, one Manager, one Compounder, two Ayahs, two Ward Boys, two Cooks, two Hamals and two Methranis.

As regards the description of the Hospital building, it is fully described in my report of the year ending 31st May 1899.

As regards Conservancy, water supply, disinfection of wards, &c., and the disposal of the dead, the same measures were adopted as was done last year; every attention was paid to cleanliness and disinfection.

A list giving full particulars of cases inoculated with Prof. Haffkine's serum is herewith attached.

There was no sickness amongst the staff of the Hospital from any infectious disease.

Enclosed please find 9 tables, giving full particulars as regards the number of cases admitted, deaths, recoveries, percentage of mortality, &c.

During the week ending 31st March 1900, there were 9 patients admitted which is the highest number of admissions in one week, and 4 patients admitted on the 23rd September 1899, which is the largest number admitted in one day.

The total number of deaths during the year was 56, of which 55 were plague cases; the average mortality per hundred is 43.5. Out of the 55 patients who died in Hospital from plague, 7 were brought in a moribund condition and died within a few hours after admission.

Symptoms, character, and treatment of the disease: I have given in my last report full details of the same; this year very few new symptoms have been observed, except in three of the plague cases small-pox eruptions appeared; when these patients were admitted into the Hospital, they had all the symptoms of plague with characteristic buboes, but during convalescence they developed small-pox. One patient was sent to the Hospital with all the symptoms of plague, except the characteristic bubo; in this patient the nervous symptoms were well marked. In consultation with Dr. Hunt, the case was diagnosed to be one of plague, most probably the case was one of septicæmic form.

The total number of patients admitted under observation was 19, of whom 5 developed plague and were transferred to the plague ward, one developed small-pox and was discharged cured. All the small-pox cases were isolated from other patients in the Hospital.

There were 8 pregnant females admitted suffering from plague, of whom 4 died and 4 recovered, 3 of them aborted varying from 4 to 14 days after the onset of the disease. The mortality amongst the pregnant patients was 50 per cent.

No cases were treated this year by Prof. Lustig's curative serum.

Dr. Hunt visited the Hospital from time to time and assisted me in diagnosing suspicious cases.

Lt. Brackenbury, the District Officer, " B " Ward South, visited the Hospital often and gave us valuable advice from time to time.

KHAJEE ABDULLAH, L. M. & S.,
Medical Officer in charge.

List of Patients inoculated with Prof. Haffkine's Serum.

No.	Names.	Age.	Sex.	Date of Inoculation.	Date of Attack.	Date of Admission.	Date of Death.	Date of Discharge.
1	Nantai, wife of Hirje Premjee.	30	F.	Inoculated once about 2 months ago or 2 months before attack.	17-11-99	28-11-99	.....	11-12-99
2*	Meherally Premjee	19	M.	26-1-99. 17-8-99.	7-1-00	9-1-00	.....	4-2-00
3	Jever Anandjee	35	M.	Inoculated twice 3 months before attack.	17-3-00	21-3-00	.....	22-4-00
4	Nanbai, daughter of Rattan-ey Dhunjee.	8	F.	3 months before attack.	22-3-00	24-3-00	.....	9-4-00
5	Rehman Jiva	45	M.	15-10-99.	24-3-00	28-3-00	.....	13-4-00
6	Nazerali Jamal	20	M.	Inoculated twice. Last time in Oct. 1899.	13-4-00	17-4-00	19-4-00	.....

* Developed small-pox on 12th January 1900.

TABLE No. I.

Total Admissions during the year.

Months.	Plague.	Relapsing Fever.	Observation Cases.	Total.
June 1899	3	.....	.....	3
July "	3	.....	1	4
August "	4	.....	1	5
September "	9	.....	.....	9
October "	10	.....	.....	10
November "	5	.....	2	7
December "	9	.....	7	16
January 1900	9	.....	.....	9
February "	7	.....	1	8
March "	19	.....	4	23
April "	20	.....	1	21
May "	17	.....	2	19
	115	.....	19	134

TABLE I.

	Admissions.	Deaths.	Recoveries.	Percentage of mortality.
Plague	115	* 55	60	47·8 per cent.
Relapsing Fever ... ..	.....	.....	.....	.....
Observation and other Diseases.	19	1	18	52 per cent.
Total.....	134	56	78	41·8 per cent.

* 7 patients were brought in a moribund condition and died within a few hours after admission.

TABLE III.

Months.	Total admissions.	Died within 24 hours.	Died within 48 hours.	Total deaths.	Total recoveries.	Percentage of deaths.
June 1899 ...	3	.....	1	1	2	33·3
July „ ...	3	1	1	2	1	66·6
August „ ...	4	2	1	4	.....	100
September „ ...	3	2	1	5	4	55·5
October „ ...	10	1	3	6	4	60
November „ ...	5	2	1	4	1	80
December „ ...	9	1	.....	6	3	66·6
January 1900 ...	9	.....	2	3	6	33·3
February „ ...	7	.....	1	2	5	28·2
March „ ...	19	4	3	7	12	36·8
April „ ...	20	2	1	8	12	40
May „ ...	17	.....	2	7	10	41·1
Total ...	115	15	17	55	60	.....

TABLE IV.

	Total Admissions.	Deaths.	Recoveries.	Percentage of Deaths.
Males	54	26	28	48·1
Females	45	22	23	48·8
Children under 12 years ...	16	7	9	43·75
Total ...	115	55	60	47·8

TABLE V.

Table showing the mortality for the year amongst sexes and children.

Total mortality for the year.	Mortality amongst men.	Mortality amongst women.	Mortality amongst children (all under 12 years of age).
55	26	22	7

TABLE V (A).

Percentage of Mortality amongst the following Ages.

No.	Age years.	Percentage of Mortality.	No.	Age years.	Percentage of Mortality.
1	Up to 1 year ...	.....	4	20 years to 30 ...	43·8
2	1 year to 10...	46·1	5	30 „ „ 40 ...	41·6
3	10 years „ 20 ...	46·5	6	40 „ and upwards ...	56·2

TABLE VI.

Table showing the Situation of Buboes.

Situations.	Total No. of cases.	Males.	Females.	Mortality.	Recoveries.	Percentage of mortality.
Cervical ...	6	5	1	3	3	50
Right axillary ...	7	4	3	5	2	71·4
Left axillary...	9	3	6	4	5	44·4
Right femoral ...	26	16	10	12	14	46·15
Left femoral...	22	13	9	8	14	36·3
Right inguinal ...	17	6	11	8	9	47·0
Left inguinal ...	13	8	5	9	4	69·2
Other situations.	.....	.....	.....	.....	.....	.....
No buboes ...	1	1	.....	.....	1	.....
Multiple buboes ...	14	7	7	6	8	42·8
Total ...	115	63	52	55	60	.....

TABLE No. VII.

Table showing Pneumonia Plague (without Buboes).

	Admitted.	Died.	Recovered.	Percentage of Mortality.
Males
Females
Children

TABLE No. VIII.

Table showing Cases of Secondary Plague Pneumonia (Complicated with Buboes).

	Admitted.	Died.	Recovered.	Percentage of Mortality.
Males	6	1	5	16·6
Females	9	4	5	44·4
Children	2	1	1	50

No. 10.

Report on the General Mahomedan Hospital, Northbrook Garden, Bombay, from 1st June 1899 to 31st May 1900.

The list of medical staff of the Hospital runs as follows :—

Medical Officer—Hakeem T. Rahman.

Compounder and General Clerk—Moonshee Mahomed Yousof.

One Temporary Assistant Clerk.

One Store Clerk.

The increase shown in February 1900 in the number of ward boys and ayahs

	1899.	1900 Feb.	Now.
Ward Boys	2	6	3
Ayahs	2	3	1

was due to the fact that the epidemic had been very high at the time, and the work had consequently increased too much to be

managed by less than the additional hands then engaged.

The Hospital buildings are the same shown in my last year's report with the exception of one small-pox ward, which was built of the same materials, *viz.*, bamboo mats, and jawhlics. One Dohbies' Bahty was built of corrugated sheet iron.

As regards sickness amongst the staff, a ward boy was attacked on the 28th February 1900, afterwards developed into chronic diarrhoea and died on the 4th of April 1900.

A Bhanghy's daughter, aged 4 years, also residing within the Hospital premises, was attacked by plague, a small gland appeared on the left groin, temperature 104° with a touch of delirium and soon recovered.

The tabular statement (I) asked for under this paragraph is attached with this report.

The largest number of cases admitted was 46 in the week ending 24th March 1900 and 45 in the week ending 31st March 1900.

The total number of deaths from all causes during the year was 321, and the largest number of deaths was 20 on the 31st March 1900, and 20 on the 7th April 1900.

The total weekly deaths during the year was as follows :—

Week ending.					Deaths.	Week ending.					Deaths.
3rd	June	1899	...	...	...	2nd	December	1899	...	...	4
10th	"	"	...	...	1	9th	"	"	...	...	1
17th	"	"	...	...	3	16th	"	"	...	...	2
24th	"	"	...	...	...	23rd	"	"	...	...	8
						30th	"	"	...	...	9
1st	July	"	...	...	...	6th	January	1900	...	...	4
8th	"	"	...	...	...	13th	"	"	...	...	14
15th	"	"	...	...	2	20th	"	"	...	...	8
22nd	"	"	...	...	...	27th	"	"	...	...	6
29th	"	"	...	...	3						
5th	August	"	...	...	1	3rd	February	"	...	...	6
12th	"	"	...	...	3	10th	"	"	...	...	13
19th	"	"	...	...	5	17th	"	"	...	...	13
26th	"	"	...	...	2	24th	"	"	...	...	4
2nd	September	"	...	...	3	3rd	March	"	...	...	7
9th	"	"	...	...	5	10th	"	"	...	...	11
16th	"	"	...	...	1	17th	"	"	...	...	18
23rd	"	"	...	...	3	24th	"	"	...	...	16
30th	"	"	...	...	4	31st	"	"	...	...	20
7th	October	"	...	...	2	7th	April	"	...	...	20
14th	"	"	...	...	4	14th	"	"	...	...	16
21st	"	"	...	...	1	21st	"	"	...	...	17
28th	"	"	...	...	1	28th	"	"	...	...	15
4th	November	"	...	...	2	5th	May	"	...	...	14
11th	"	"	...	...	4	12th	"	"	...	...	8
18th	"	"	...	...	1	19th	"	"	...	...	6
25th	"	"	...	...	1	26th	"	"	...	...	2
						31st	"	"	...	...	7
						Total					321

The percentage of deaths to admission was about 43.

The various tabular statements asked for with this report are attached herewith as follows :—

Two	Statements of	...	...	No.	I
One	"	"	...	"	II
Two	"	"	...	"	III
Four	"	"	...	"	IV
Two	"	"	...	"	V
One	"	"	...	"	VI
One	"	"	...	"	VII

H. T. RAHMAN,

In Charge, General Mohomedan Hospital.

23rd July 1900.

TABLE NO. I. (A).—*Total admissions during the year 1899 and 1900.*

1 Months.					2 Plague.	3 Relapsing Fever.	4 Observation cases, including all General Diseases.	5 Total.
June	1899	...	...	..	3	1	6	10
July	,,	..	...	...	14	.....	8	22
August	,,	...	...	...	31	.....	8	39
September	,,	...	...	...	23	.....	9	32
October	,,	...	...	...	16	2	3	21
November	,,	...	...	...	21	.....	11	32
December	,,	...	...	...	35	.....	18	53
January	1900	...	...	...	62	.....	27	89
February	,,	...	...	...	54	.....	30	84
March	,,	...	...	...	112	.....	46	158
April	,,	...	...	...	86	2	47	135
May	,,	...	...	...	45	4	24	73
Total					502	9	237	748

The cases given in column No. 4 also include among general diseases plague pneumonic cases and small-pox, chicken-pox and measles, of which separate statements have also been appended.

TABLE I. (B).

Total admission of Small-pox, Chicken-pox, and Measles during the year 1899-1900.

Months.					Small-pox.	Chicken-pox.	Measles.	Total.
June	1899	...	...	...	.....	.....	.....	.....
July	,,	...	...	...	1	.....	.....	1
August	,,	...	...	...	.....	.....	.....	.....
September	,,	...	...	...	.....	.....	.....	.....
October	,,	...	...	...	.....	.....	.....	.....
November	,,	...	...	...	.....	.....	.....	.....
December	,,	...	...	...	.....	.....	.....	.....
January	1900	...	...	...	1	2	.....	3
February	,,	...	...	...	5	5	.....	10
March	,,	...	...	...	.....	.....	.....	.....
April	,,	...	...	...	.....	.....	.....	.....
May	,,	...	...	...	.....	.....	.....	.....
Total					7	7	.....	14

TABLE No. II.

	Admissions.	Deaths.	Recoveries.	Percentage of Mortality.
Plague	502	268	234	54 %
Relapsing fever	9	.....	9	...
Observation and other diseases	237	53	184	23 %
Total ...	748	321	427	43 %

TABLE No. III. (A)

1	2	3	4	5	6	7
Months.	Total Admissions	Died within 24 hours.	Died within 48 hours.	Total Deaths.	Total Recoveries.	Percentage of Deaths.
June 1899 ...	10	.....	.....	4	6	40 per cent.
July „ ..	22	1	.....	5	17	23 „
August „ ..	39	1	5	16	23	41 „
September „ ..	32	2	3	13	19	41 „
October „ ..	21	1	.....	9	12	43 „
November „ ..	32	2	1	11	21	38 „
December „ ..	53	4	3	20	33	38 „
January 1900 ...	89	3	4	36	53	44 „
February „ ..	84	5	9	35	49	43 „
March „ ..	158	10	14	68	90	43 „
April „ ..	135	20	13	71	64	53 „
May „ ..	73	2	1	33	40	45 „
Total ...	748	51	53	321	427	43 „

In the cases shown under column No. 3 many of them were admitted dead in the ambulance and many died within a couple of hours.

TABLE No. III (B).

Table showing cases of Relapsing Fever.

Months.	Total Admissions.	Total Deaths.	Total Recoveries.	Percentage of Deaths.
June 1899 ...	1	.....	1	.....
July „ ..	...	.....	.....	.....
August „ ..	.....	.....	.....	.....
September „ ..	.....	.....	.....	.....
October „ ..	2	.....	2	.....
November „ ..	.....	.....	.....	.....
December „ ..	.....	.....	.....	.....
January „ ..	.....	.....	.....	.....
February „ ..	.....	.....	.....	.....
March „ ..	...	.....	.....	.....
April „ ..	2	.....	2	.....
May „ ..	4	.....	4	.....
Total ...	9	.....	9	.....

TABLE No. IV (A).

Total Admissions.	Deaths.	Recoveries.	Percentage of Deaths.
748	321	427	43 o/o

TABLE No. IV (B).

Table showing admissions of High Caste Hindus.

	Total Admissions.	Deaths.	Recoveries.	Percentage of Deaths.
Male... ..	1	...	1	...
Female	2	2	...	...
Children (under 12 years) ...	2	1	1	50 o/o
Total ...	5	3	2	60 o/o

TABLE No. IV (C).

Table showing admissions of Low Caste Hindus.

	Total Admissions.	Deaths.	Recoveries.	Percentage of Deaths.
Male... ..	2	1	1	50 o/o
Female ... ..	...	...	...	.....
Children (under 12 years) ...	...	...	...	.....
Total ...	2	1	1	50 o/o

TABLE No. IV (D).

Table showing admissions of Bhungies.

	Total Admissions.	Deaths.	Recoveries.	Percentage of Deaths.
Male... ..	...	...	...	.....
Female ... ..	...	...	...	.....
Children (under 12 years) ...	1	...	1	.....
Total ...	1	...	1	.....

TABLE NO. V.

Table showing the mortality for the year amongst sexes and children.

Total mortality for the year.	Mortality amongst the men.	Mortality amongst the women.	Mortality amongst children all under 13 years of age.
321	219	60	42

TABLE NO. V (A).

Table showing Percentage of Mortality amongst the following ages.

	Admissions.	Deaths.	Recoveries.	Percentage of Mortality.
Up to 1 year ..	1	1	.....	.....
1 year to 10 years ...	69	23	46	34 o/o
10 years to 20 „ ...	161	63	98	39 o/o
20 years to 30 „ ...	299	135	164	45 o/o
30 years to 40 „ ...	131	53	78	41 o/o
40 and upward „ ...	87	46	41	53 o/o
Total ...	748	321	427	43 o/o

TABLE NO. VI.

Table showing the situation of Buboes.

Situation.	Total No. of cases.	Males.	Females.	Mortality.	Recovery.	Percentage of Mortality.
Cervical	13	12	1	8	5	62 o/o
Parotid	11	9	2	7	4	64 o/o
Right axillary	25	12	13	18	7	72 o/o
Left axillary	29	20	9	18	11	62 o/o
Right femoral	20	13	7	9	11	45 o/o
Left femoral	48	40	8	25	23	52 o/o
Right inguinal	111	88	23	72	39	65 o/o
Left inguinal	98	78	20	44	54	45 o/o
* Other situations ...	9	3	6	4	5	45 o/o
No Buboes	90	67	23	40	50	45 o/o
Multiple Buboes ...	48	38	10	23	25	48 o/o
Total ...	502	380	122	268	234	54 o/o

* 2 buboes under the jaw, 3 buboes on the throat, 1 bubo under the chin, 1 bubo on the chest, 1 bubo on the hand, and 1 bubo under the left thigh.

TABLE No. VII.

Table showing Pneumonic Plague (without Buboes.)

	Admitted.	Died.	Recovered.	Percentage of Mortality
Males	27	17	10	63 o/o
Females	8	6	2	70 o/o
Children	7	2	5	29 o/o
Total	42	25	17	60 o/o

TABLE No. VIII.

Table showing Cases of secondary Plague Pneumonia complicated with Buboes.

	Admitted.	Died.	Recovered.	Percentage of Mortality.
Males	8	4	4	50 o/o
Females ... ..	...	...	...	...
Children ... ..	...	...	...	...
Total	8	4	4	50 o/o

H. T. RAHMAN,
In charge, General Mahomedan Hospital.

No. 11.

Report of the Mahim Plague Hospital for the year ending 31st May 1900.

This Hospital was opened in Mahim in June 1899 by Government under suggestion from the District Officer, F. & G. Wards, for the convenience of the sick from Mahim and Dharavi, as great difficulty was experienced in transferring plague cases from these localities to the Arthur Road Hospital, a distance of nearly 4 miles. The experience of 1897 and 1898 showed distinctly that removal of plague cases in the monsoon to Arthur Road Hospital from Dharavi was very injurious to the patients, so after due deliberation the District Officer suggested to higher authorities the opening of this Hospital which took place in June 1899.

It is situated on the west of the Mahim Railway Station on the raised Municipal ground which is sand covered with moorum.

The Hospital is made up of wooden and bamboo posts, covered over with mattings and the roof of corrugated iron. It has a roofed verandah with a width of 3 feet.

It is divided into 21 compartments, each one measuring $10' \times 10' \times 10'$, out of which 12 are used for sick persons, one separate room for each patient, so there is accommodation for 12 patients. One room is used as lady nurses' quarters, one for House Surgeon, one cook-room, one store-room, 4 servants' quarters, the central one is for the dispensary, and the last, on the south side, is a mortuary, quite separate. There is also an office.

There is a pretty garden made by the lady nurse in charge in 1897-98 and kept up by the staff in front of the Hospital.

About 150 feet from the Hospital are the quarantine sheds, where there is accommodation for nearly 100 contacts and evicts. They are made of jawlis, mattings and bamboo posts.

There are 5 latrines, 2 for males and 2 for females, with chunam and concrete beddings, with a well-built cesspool; one is specially kept separate for Hospital patients' excreta.

The excreta is removed twice a day by a specially kept car, which is properly disinfected.

The water-supply is from pipes.

There is one service pipe for the Hospital use, one old standing one for dhobie and general use, and one stand-pipe with two taps for the segregation camp.

The waste-water is drained off to surrounding trees and fields.

Staff.

When the Hospital was first opened on 20th June 1899 the Medical Officer in charge was Dr. Shikari, an European lady nurse, 2 ward boys, 2 ayahs, 1 cook, 1 dhobi, 2 melters, 2 mehtranies, 1 cart-driver, and 2 ramosis.

After Dr. Shikari left Mr. Haté took charge until relieved by Dr. P. D. Hormusjee from October 1899 to the end of May 1900 and then by Dr. Dady Burjor. There was no change in the native staff.

Disinfection of Clothes.

The patients' clothes are first disinfected by dipping into a carbolic solution and then handed over to the dhobie for washing; those which are very dirty and old are destroyed by fire.

The clothes from this Hospital are never sent to any steam disinfecter, distance being too great.

After the removal of the sick, either after death or discharged cured, the rooms are thoroughly disinfected by carbolic solution, a strong one, and then carbolic powder is sprinkled over the floor and the place swept out thoroughly after 6 to 12 hours, as the room requires. During the interval the place is allowed free ventilation.

Disposal of bodies.

The deaths from the Hospital are generally disposed of according to the caste rules by the relatives of the deceased, but unclaimed bodies were sent to Haines Road cemetery and cremated there.

The bodies are generally kept at the mortuary to see if any claimant comes to claim them within 24 hours, but in case of known paupers, and those known during life as having no friends and relatives, they were sent away within 10 to 12 hours to the cemetery.

From the records it appears that out of the total number of 170 admissions only one inoculated person, who was admitted on the 9th May 1900 and died 10th May 1900, from Purbadevi Road, House No. 897, Nama Badhoo, male, 25 years

old, from whose certificate it appeared that he was inoculated some more than 6 months before the attack, died. The certificate was forwarded to the District Office by the Section Medical Officer of the Section. All the rest of the patients were non-inoculated ones.

No cases occurred amongst the Hospital staff and the record shows no sickness amongst them. The whole staff was all inoculated once.

There was only one death, and that was of the dhobie who got a touch of diarrhoea, went on sick leave and died somewhere at Parel.

In this Hospital patients had the option of their own special medical men. Of such kind 14 cases were admitted :—

4	treated by native Vaidyas	(all died.)
1	„ Dr. Khaja Abdulla	(do.)
1	„ „ Dadarker	(do.)
5	„ „ Dordi	(do.)
1	consulted „ Ismail Jan Mahomed	(do.)
2	„ „ Dady Burjor	(do.)

Treatment of patients.

In accordance with Deputy Plague Commissioner's order for treatment of Dharavi Tannery patients, Dr. Dordi was allowed to treat 7 cases, 6 died, 1 convalescent.

During the year 531 contacts were admitted into the Quarantine Camp, out of which 7 developed plague, 5 relapsing fever, 1 ran away, developed plague and died in Mahim, Lohar Chawl.

230 contacts and evicts were inoculated at the Hospital.

The general course of treatment followed here was Hydrag.-Perch. Pot. Iodide, Strychnia, stimulants and strophanthus as the case necessitated it. No particular treatment was done here.

I regret that am unable to furnish better information as regards this Hospital, as Dr. Hormusjee, who had charge of the Hospital all through the epidemic, has been discharged.

C. BOILEAU, CAPT.,

District Officer, F. and G. Wards.

TABLE I.—*Showing total admissions during the year.*

Months.	Plague.	Relapsing fever.	Observation cases including all general diseases.	Total.
June 1899 to May 1900... ..	132	19	19	170

The largest number of admissions was during the week ending 31st March 1900—11.

TABLE II.

Diseases.	Admissions.	Deaths.	Recoveries.	Percentage of mortality.
Plague	132	97	35	73·4
Relapsing fever	19	6	13	31·5
Observation and other diseases	19	4	15	21·05
Total ...	170	107	63	62·9

TABLE III.

Months.	Total admissions	Died within 24 hours.	Died within 48 hours.	Total deaths.	Total recoveries.	Percentage of deaths.
June 1899 to May 1900 ...	170	32	49	107	63	62·9

TABLE IV.

Christians.

	Total admissions.	Deaths.	Recoveries.	Percentage of deaths.
Males	7	5	2	71·4
Females	7	5	2	71·4
Children under 12 years...	1	1	...	...

Hindus.

	Total admission of all diseases.	Deaths.	Recoveries.	Percentage of deaths.
Males	99	65	34	65·6
Females	32	20	12	62·5
Children under 12 years	20	9	11	45

Mahomedans.

	Total admissions of all diseases.	Deaths.	Recoveries.	Percentage of deaths.
Males ... ..	...	...	...	...
Females	3	2	1	66·6
Children under 12 years	1	...	1	...

TABLE V.

Total mortality for the year.	Mortality amongst men.	Mortality amongst women.	Mortality amongst children under 12 years of age.
107	70	27	10

TABLE V. (A).

	Admissions.	Deaths.	Percentage of mortality.
1. Up to 1 year ... ..	.....	.....	.....
2. 1 year to 10 years	19	7	36·8
3. 10 years to 20 „	40	25	62·2
4. 20 „ 30 „	61	38	62·3
5. 30 „ 40 „	28	18	64·8
6. 40 „ and upwards	22	19	86·3
Total ...	170	107	.....

TABLE VI.

Situation of buboes.	Total number of cases.	Males.	Females.	Mortality.	Recoveries.	Percentage of mortality.
Cervical	7	4	3	4	3	57·1
Parotid	6	5	1	6	.....	.....
Right axillary	13	5	8	11	2	84·6
Left axillary	5	3	2	3	2	60
Right groin	40	30	10	32	8	80
Left groin	42	32	10	27	15	64·2
No buboes	5	4	1	5	.....	.....
Multiple	14	8	6	9	5	64·2
Total ...	132	91	41	97	35	73·4

Table showing Pneumonic Plague.

	No. of cases of Secondary Pneumonia with Buboes.	No. of cases of Pneumonia Plague without any Bboes.
Males	14	3
Females	7	1
Total ...	21	4

} All fatal.

These both forms of plague are the most fatal.

Complications.—In one case, pregnancy, attack of plague and abortion. In two cases phthisis supervened after all the symptoms of plague had disappeared. One of these lingered in this hospital for nearly two months and then died, while the other was transferred to J. J. Hospital as a very bad form of deep ulcer on the hip joint was formed. In one case purulent ophthalmia supervened in both eyes, one was totally lost, the other healed up, but in this eye no sight is possible without iredectomy.

There were 19 cases kept under observation which were mostly of febricula, Bronchitis acute, and intermittent fever; out of which 2 developed variola and were transferred to Arthur Road Hospital.

In one case there was loss of power in the lower extremities, the man is taking massage now and home remedies.

No. 12.

Report on the Port Trust Plague Hospital, Bombay,
from the 25th December 1899 to 31st May 1900.

The Hospital was re-opened on the 25th December 1899.

Staff.

1 Medical Officer.	1 Cook.
1 Hospital Assistant.	1 Ayah.
1 Compounder.	2 Sweepers.
4 Ward Boys.	2 Ramosis.

The above establishment was the maximum during the height of the epidemic of 1899-1900 and varied at different periods according to requirements.

History and description of the Hospital, water-supply, disinfection, and method of disposal of the dead have been fully described in last year's report.

The plague cases (treated) were not previously inoculated with Professor Haffkine's prophylactic; only one case, named Rama Ragho, male, aged about 40 years, Mahar by caste, who was inoculated by Haffkine's serum on 23rd December 1899, was admitted in the observation ward, suffering from Bright's disease, of which he died on 16th January 1900.

The Hospital staff enjoyed good health.

TABLE I.

Total admissions during the year.

Months.	Plague.	Relapsing Fever.	Observation cases includ- ing all gene- ral diseases.	Total.
1899.				
December	4	.....	1	5
1900.				
January	11	.....	8	19
February	11	.....	4	15
March	15	.....	7	22
April	15	.....	7	22
May	2	.....	3	5

The largest number of admissions was during the week ending 3rd March 1900 when 6 plague patients were admitted.

The largest number of admissions on any day was on the 2nd March 1900, on which day 3 patients were admitted.

Total number of deaths during the year, 48.

Total number of deaths from plague, 45.

Total weekly deaths, 6 in the week ending 21st April 1900. Percentage of deaths to admission during the week—100·0 per cent.

The largest number of deaths, was 3 on the 16th April 1900.

TABLE II.

	Admissions.	Deaths.	Recoveries.	Percentage of Mortality.
Plague	58	45	13	77·59
Relapsing fever ... ..	.....	.....	.....	.....
Observation and other diseases ...	30	3	27	10·00
Total ...	88	48	40	43·79

TABLE III—*Plague.*

Months.	Total Admissions.	Died within 24 hours.	Died within 48 hours.	Total Deaths.	Total Recoveries.	Percentage of Deaths.
1899.						
December	4	.....	1	4	.....	100·0
1900.						
January	11	2	2	10	1	90·9
February	11	2	1	9	2	81·8
March	15	1	1	9	6	60·0
April	15	2	1	11	4	73·3
May	2	.....	... ..	2	.....	10·0

No relapsing fever cases were admitted.

TABLE IV.—*Hindus.*

	Total Admissions.	Deaths.	Recoveries.	Percentage of Deaths.
Males	33	26	7	78·9
Females	12	8	4	66·7
Children (under 12 years)	3	3	.....	100·0

TABLE IV (A).—*Mahomedans.*

	Total Admissions.	Deaths.	Recoveries.	Percentage of Deaths.
Males	8	7	1	87·5
Females ... ..	.....	.....	.....	.....
Children (under 12 years)	2	1	1	50·0

There were no admissions of Parsis, Jews, Eurasians and Christians.

TABLE V.

Table showing Mortality for the year amongst Sexes and Children.

Total mortality for the Year.	Mortality amongst Men.	Mortality amongst Women.	Mortality amongst Children (all under 12 years of age).
45	33	8	4

TABLE V (A).

Percentage of Mortality amongst the following ages.

No.	Age.	Percentage of Mortality.	No.	Age.	Percentage of Mortality.
1	Up to 1 year	100·0	4	20 to 30 years	68·0
2	1 to 10 years	75·0	5	30 „ 40 „	83·3
3	10 „ 20 „	100·0	6	40 and upwards	81·8

TABLE VI.

Table showing the Situation of Buboes.

Situation.	Total number of cases.	Males.	Females.	Mortality.	Re- coveries.	Percen- tage of Mortality.
Cervical	4	2	2	3	1	75·0
Parotid ... ..	.....	.....	.....	.....	.....	.....
Right axillary	6	5	1	4	2	66·6
Left axillary	5	4	1	4	1	80·0
Right femoral	8	6	2	7	1	87·5
Left femoral	6	6	.....	5	1	83·3
Right inguinal	4	2	2	3	1	75·0
Left inguinal... ..	2	1	1	2	.....	100·0
Other situations ... ..	.....	.....	.....	.....	.....	.....
No buboes	8	6	2	7	1	87·5
Multiple buboes	15	11	4	10	5	66·0

TABLE VII.

Table showing Pneumonic Plague (without Buboes).

	Admitted.	Died.	Recovered.	Percentage of Mortality.
Males	7	6	1*	85·7
Females	1	1	.....	100·0
Children ... ..	.....	.....	.....	0·0

TABLE VIII.

Table showing Cases of Secondary Plague Pneumonia (complicated with Buboes).

	Admitted	Died.	Recovered.	Percentage of Mortality.
Males	3	1	2	33·3
Females	1	.....	1	0·0
Children ... ..	.....	.....	.....	.....

Bacteriological examination was made of the sputum of one case marked* in Table VII. by Dr. Hunt. The occurrence of plague cases in the room adjacent to that in which the patient lived, his close contact with those cases, the rapid development of grave physical signs in the case of the patient soon after the onset of fever accompanied with head symptoms, and the special character of his heart beats and pulse, resembling almost those of a purely plague patient, were the conditions which led to the conclusion that the case was of pneumonic character. Further more, the condition, the symptoms and the aspect of the patient resembled in every way those observed in the seven other cases of the same type of the diseases, which proved fatal and are noted in Table VII.

Pneumonia generally supervened among the cases in Table VIII on the third or fourth day.

Symptoms, character and treatment of the disease with its period of incubation, have been described in last year's report.

Observation cases numbered 30, from which one developed plague and two small-pox.

SHIVDAS PARMANANDAS, L. M. & S.,

Medical Officer, in charge

Port Trust Plague Hospital.

No. 13.

Report of the Pathare Prabhu Fever Hospital, Bombay, from 7th December 1897 to 31st May 1900.

Committee.

Dr. A. V. Velkar, L. M. S. ... Chairman and Chief Medical Officer.

Dr. V. S. Trilokekar, L. M. & S. }
Dr. S. B. Nayak, L. M. & S. ... } Members of the Committee and Honorary
Dr. A. P. Kothare, L. M. & S. ... } Medical Officers in
charge.

Mr. S. B. Dharadhar (Senior Medical Student). Honorary Resident House Surgeon.

Besides the above Officers, voluntary services were also rendered by the following members of the community :—

Atmaram J. Kirtikar, Esq. ... Honorary Secretary.

Anandrao Harishankar, Esq. ... Honorary Treasurer.

Mr. S. N. Nawalkar ... Honorary Chief Superintendent.

Mr. A. S. Nayak ... }
Mr. S. R. Dhairyawan ... } Volunteers.
Mr. R. D. Kirtikar ... }

Mr. V. S. Kothare also rendered some services occasionally.

The history of the foundation, the description of the Hospital, conservancy, water-supply, disinfection and disposal of the dead is the same as mentioned in the last year's report.

Out of the 20 cases admitted during the year only two had been previously inoculated.

Details of cases inoculated previously by Professor Haffkine's prophylactic.

Name.	Age.	Sex.	Date of inoculation.	Date of attack.	Cured or not.	Seat of bubo.	Inoculated by
Manakbai Gajanan Rane ...	6	Female.	Twice in 1897 & 1898.	18-12-99.	Cured 17-1-00.	Right femoral.	Dr. S. B. Nayak.
Motiram Narayan Ranjit... ..	14	Male.	Once in March 1897.	3-2-00.	4-4-00.	Right inguinal.	Professor Haffkine.

Sickness, &c., amongst the Staff—Fortunately none from amongst the Staff of the Hospital suffered from any sickness.

TABLE I.

Months.	Plague.	Relapsing Fever.	Observation cases including all general diseases.	Total.
December 1899	10	...	...	10
January 1900 ... ..	...	...	1	1
February „	4	...	...	4
March „	4	...	...	4
April „	1	...	...	1
				20

The largest number of admissions were on the 18th of December 1899.

The total number of deaths during the year was 15. All of these were from plague.

TABLE II.

	Admissions.	Deaths.	Recoveries.	Percentage of Mortality.
Plague	19	15	4	.....
Relapsing Fever ... ..	...	...	...	78.9
Observation and other diseases	1	...	1	.....
Total	20	15	5	.....

TABLE III.

Months.	Total Admissions.	Died within 24 hours.	Died within 48 hours.	Total Deaths.	Total Recoveries.	Percentage of Deaths.
December 1899	10	2	2	7	} 5	75
January 1900	1	1	.....	2		
February „	4	2	.....	2		
March „	4	4	.....	4		
April „	1	.....	.....	.....

Out of the 20 patients admitted as shown in the above table, the one admitted in January was the only case that was not a plague case.

TABLE IV.

	Total Admissions	Deaths.	Recoveries.	Percentage of Deaths.
Males	11	9	2	81·8
Females	6	4	2	66·6
Children under 12 years	3	2	1	66·6

TABLE V.

Total mortality for the year.	Mortality amongst men.	Mortality amongst women.	Mortality amongst children (all under 12 years of age).
15	9	4	2

TABLE V (A).

Percentage of Mortality amongst the following Ages.

No.	Age.	Percentage of mortality.	No.	Age.	Percentage of Mortality.
1	Up to 1 year ... ..	...	4	20 years to 30 years ...	100
2	1 year to 10 years ...	66·6	5	30 „ „ 40 „ ...	80
3	10 years „ 20 „ ...	62·5	6	40 „ „ and upwards...	100

TABLE VI.

Situation.	Total No. of cases.	Male.	Female.	Mortality.	Recoveries	Percentage of Mortality.
Cervical ... ..	.....	.....	.....	.....	.....	100
Parotid	1	.....	1	1	.....	.....
Right axillary	5	2	3	4	1	80
Left axillary	2	1	1	2	.....	100
Right femoral	3	2	1	1	2	33·3
Left femoral ... ..	.....	.....	.....	.....	.....	.....
Right inguinal	4	4	.....	3	1	75
Left inguinal	3	2	1	3	.....	100
Other situations ... ..	.....	.....	.....	.....	.....	.....
No buboes ... ..	.....	.....	.....	.....	.....	.....
Multiple buboes (right cervical and left femoral).	1	1	.....	1	.....	100

None of the cases admitted during the year under report were of the pneumonic type.

Symptoms, &c.—In the majority of cases there was a clear history of rat mortality in the houses. Most of these presented the characteristic physiognomy, tongue, pulse and injection of the ocular conjunctiva.

Vomiting was present in about 50 per cent. of cases. In two cases there was spitting and vomiting of blood. There was diarrhoea in 10 per cent. and constipation in about 30 per cent. of cases. Convulsions were observed only in one case. Hiccough was seen also in one case only. Nearly 25 per cent. of cases admitted this year were brought in an unconscious state. Delirium and headache were present in almost all the cases. The maximum temperature recorded this year was 106.4. That in admission varied between 101 and 106. In almost all the cases there were signs of cardiac failure.

Incubation period.—The few data that were available this year confirmed the observations made last year regarding the incubation period.

Treatment.—The general line of treatment was chiefly stimulant and nutritive. Liq. Iodi terohloride was tried internally but with no special effects. Strychnia, strophanthus and caffein were chiefly used as cardiac tonics. Spartin and atropin were also tried, and the latter with a fair amount of success. For delirium, morphia was found useful. For hyperpyrmia no depressing antipyretics were used, but ice bag and wet pack were resorted to. No special treatment was tried locally. Curative serums were not given any trial at all.

A. V. VELKAR, L. M. & S.,

Hony. Chief Medical Officer in charge

Pathare Prabhu Fever Hospital.

No. 14.

Report on the Proceedings of the Bhatia Plague Hospital, Modikhana, Bombay, from 12th August 1899 to 31st May 1900.

The foundation of the hospital was laid on the 23rd July 1899 and was opened on the 12th August 1899.

The names of the Members of the Committee are as follows:—

President.

Rao Bahadur Vassonji Khimji.

Managers.

Rao Saheb Purshotam Odhaoji.

Mr. Khimji Dhunji.

Treasurer.

Mr. Soonderdas Dhuramsey.

Secretaries.

Mr. Dwarkadas Dhuramsey.

„ Hirji Topan.

Members.

Mr. Naranji Dwarkadas.

„ Gordhandas Goculdas Tejpal.

„ Lukhmidas Khimji.

„ Narotam Morarji Goculdas.

Mr. Gordhandas Khatao.

„ Morarji Velji.

„ Runchordas Thuckersey.

„ Ruttonsey Mulji.

The name of the Medical Officer is Dr. Purshotam Harichand, L. M. & S.

The list of the medical staff is as follows :—

S. K. Gupte.	}	Hospital Assistants.
C. N. Clerk.		
Shrinbai.		Nurse.
1. Sakhia.	}	Ward boys.
2. Mulji.		
3. Valjee.		
4. Dagdo.		
5. Devji Keshav.		
6. Kachra Pitamber.		

One bhaya, two ramoshis, one cook, two ayahs, one gardener, one cashier. No donation to the hospital received.

There are four wards in the hospital, viz., (1) plague ward for males and females, containing 14 beds, (2) convalescent ward for males and females, containing 12 rooms, (3) observation ward, containing 5 rooms, and (4) contact ward, containing 8 rooms. Two nurses' quarters, one kitchen-room, one store-room, one dispensary, one cashier room, one medical officer room, Secretary's Office, and one room for the hospital assistant. There are five quarters for the servants.

There are five latrines, and the sewage is disposed of by Bhungees after having been well disinfected. The clothes are disinfected by the steam disinfector previous to washing by Dhobies.

Water supply by the pipe.

Wards and other buildings are disinfected with carbolic acid and phenyle and limewashed.

The clothes are sent for disinfection to the disinfecting station which is next to the hospital, and they are kept there for an hour or two.

All the dead bodies were burnt and the pauper patients who died were also burnt at the hospital expenses.

None of the patients was inoculated.

A finger of the ward boy, named Kachra, was bitten by a plague patient under the impulse of delirium, but the man did not get plague, his hand becoming gangrenous, he was sent to the Goculdas Tejpal Hospital.

Plague.	Relapsing Fever.	Observation cases, including all general diseases.	Small-pox.	Total.	Remarks.
59	1	2	*1	63	*Small-pox and Plague.

The largest number of admissions was in the month of January 15th, 16th and 17th.

Forty-seven patients died during the whole year, out of which 45 died of plague.

Percentage of deaths to admission is 74.603.

Largest number of deaths was on January 15th, 16th and 17th 1900.

TABLE II.

	Admissions.	Deaths.	Recoveries.	Percentage of Mortality.
Plague	59	45	14	76·27
Relapsing fever	1	.....	1	.....
Observation	2	1	1	50
Small-pox	1	1	.....	100

TABLE III.

Months.	Total Admissions.	Died within 24 hours.	Died within 48 hours.	Total Deaths.	Total Recoveries.	Percentage of Deaths.
12th August 1899 to 31st May 1900	59	15	12	45	14	76·27

TABLE III (A).—*Relapsing Fever.*

Months.	Total Admissions.	Deaths.	Recoveries.	Percentage of Deaths.
12th August 1899 to 31st May 1900..	1	.....	1	.....

TABLE IV.

	Total Admissions.	Deaths.	Recoveries.	Percentage of Mortality.
Males	43	36	7	83·72
Females	15	8	7	53·3
Children under 12 years	5	3	2	60

TABLE V.

Table showing Mortality for the Year amongst Sexes and Children.

Total Mortality for the year.	Mortality among men.	Mortality among women.	Mortality among children all under 12 years of age.
12th August 1899 to 31st May 1900	36	8	3

TABLE V (A).

Percentage of Mortality amongst the following Ages.

Ages.	Percentage of mortality.
1. Up to 1 year ... ..	.....
2. 1 year to 10 years	50
3. 10 years to 20 „	64·70
4. 20 „ 30 „	80
5. 30 „ 40 „	83·3
6. 40 years and upwards	81·25

TABLE VI.—*Showing the Situation of Buboes.*

Situation.	Total number of cases.	Males.	Females.	Mortality.	Recoveries.	Percentage of Mortality.
Right groin	14	10	4	8	6	57·14
Left groin	13	11	2	12	1	92·30
Right femoral	7	6	1	7	.....	100
Left femoral	6	6	.....	6	.....	100
Right axillary	7	3	4	3	4	42·85
Left axillary	5	3	2	3	2	60
Right cervical	3	2	1	2	1	66·6
Left cervical	2	2	.....	2	.....	100
No buboes	2	1	1	2	.....	100

C. N. CLERK,

Hospital Assistant,

Bhatia Plague Hospital.

No. 15.

**Report on the Kapole Plague Hospital, Bombay, from
1st June 1899 to 31st May 1900.**

The foundation of this hospital was laid on the 1st May 1899 and it was opened on the 1st October 1899.

Names of Committee.

(1) Seth Tribhowandas Varjiwandas. (2) Seth Tribhowandas Mangaldas Nathubhai. (3) Seth Manmohandas Ramji, J. P., Treasurer. (4) Kalianadas Keshavdas, J. P. (5) Ranchoddas Tribhowandas, Treasurer. (6) Rao Sahab Gopaladas Khoosaldas, Secretary. (7) Visram Nanji, Secretary. (8) Jamnadas Mody, Secretary.

Hon. Physician—Dr. R. Row, M. D. (London). Nurse—Pirojbai Bhajiwalla. Hospital Assistants—Shivsunker Pande and Govindrao Gunesh Vaidya. Ward boys—Pandoo and Ganoo. One Sepoy and a Dhobi. Donations were given by the Members of the Kapole Bania community to the extent of Rs. 3,610, also all the medicines required for the Hospital are supplied by Mr. Manmohandas Ramji at his own expense, and milk is supplied by Javerbai, widow of Nursidas Devidas.

The sides of the Hospital buildings are built of deal-wood boards. There are three wards, namely—one acute ward, one convalescent ward, and one observation ward, one dispensary, one store-room, one Doctor's office, one Hospital Assistants' quarter, one ward-boys' kitchen room, and one dead house. There is no contact ward. Hospital buildings are paved with Porbunder stone.

There is one latrine with two seats. Sewage is taken away by a balalkore to the night-soil depôt. Clothes were disinfected previous to washing by dhobi.

Water supply is derived from Vehar.

Wards and buildings were disinfected by lime-washing and phenyle water. the clothes were sent to the steam disinfecter ten times during the year.

There was no case which was inoculated by Haffkine's serum.

No one died or had any illness amongst the staff during the year.

TABLE I.—*Total Admissions during the year.*

Months.				Plague.	Relapsing Fever.	Observation cases, including all general diseases.	Total.
June	1899	...	...	1	.....	1	2
July	"	...	...	2	.....	.....	2
August	"	...	...	2	.....	.....	2
September	"	...	...	6	.....	.....	6
October	"	...	...	5	.....	.....	5
November	"	...	...	4	.....	.....	4
December	"	..	...	6	1	1	8
January	1900	...	...	7	.....	1	8
February	"	...	...	8	.....	1	9
March	"	...	...	7	.....	.....	7
April	"	...	...	2	1	.....	3
May	"	...	...	4	.....	1	5
Total				54	2	5	61

The largest number of cases were admitted on the 24th February 1900 and on 2nd May 1900.

Total number of deaths during the year 41 deaths. 38 deaths of plague. Largest number of deaths on 11th March 1900, two deaths on the same day.

TABLE II.

				Admissions.	Deaths.	Recoveries.	Percentage of Mortality.
Plague	...	...	...	54	38	16	70
Relapsing Fever	...	...	...	2	2	...	100
Observation and other diseases	...			5	1	4	20
Total				61	41	20	...

TABLE III.

Plague.

Months.				Total Admissions.	Died within 24 hours.	Died within 48 hours.	Total Deaths.	Total Recoveries.	Percentage of Deaths.
June 1899...	...	...	...	1	...	...	...	1	...
July „...	...	...	...	2	...	1	1	1	50
August „...	...	...	...	2	1	...	2	...	100
September „...	...	...	...	6	2	...	5	1	83
October „...	...	...	...	5	...	3	3	2	60
November „...	...	...	...	4	2	...	3	1	75
December „...	...	...	...	6	2	1	6	...	100
January 1900	...	...	...	7	3	...	5	2	62
February „...	...	...	...	8	1	1	3	5	32
March „...	..	...	...	7	3	2	6	1	86
April „...	...	...	...	2	1	...	1	1	50
May „...	...	...	...	4	...	...	3	1	75

TABLE III (A).—*Relapsing Fever.*

Months.				Total Admissions.	Total Deaths.	Total Recoveries.	Percentage of Deaths.
December 1899	...	...	...	1	1	.....	100
April 1900	..	...	...	1	1	.....	100

TABLE III (B).—*Observation, &c.*

Months.				Total Admissions.	Died within 24 hours.	Died within 48 hours.	Total Deaths.	Total Recoveries.	Percentage of Deaths.
June	...	...	...	1	...	...	...	1	...
December	...	...	...	1	...	...	...	1	..
January	...	...	...	1	...	...	...	1	...
February	...	...	...	1	...	...	...	1	...
May	...	...	...	1	...	...	1	...	...

TABLE IV.

	Total Admissions.	Deaths.	Recoveries.	Percentage of Deaths.
Males	47	34	13	72
Females	10	4	6	40
Children (under 12 years) ...	4	3	1	75

TABLE V.

Showing the Mortality amongst Sexes and Children.

Total Mortality for the year.	Mortality amongst Men.	Mortality amongst Women.	Mortality amongst Children (all under 12 years of age).
41	35	4	2

TABLE V (A).

Percentage of Mortality amongst the following Ages.

Ages.	Percentage of Mortality.	Ages.	Percentage of Mortality.
Up to 1 year ... ..	...	20 years to 30 years	71
1 year to 10 years	100	30 „ to 40 „	75
10 years to 20 years	67	40 „ and upwards... ..	50

TABLE VI.

Situations.	Total No. of cases.	Males.	Females.	Mortality.	Recoveries.	Percentage of Mortality.
Cervical	6	5	1	4	2	67
Right axillary	6	5	1	2	4	39
Left axillary	4	2	2	2	2	50
Right femoral	8	6	2	6	2	75
Left femoral	2	2	...	2	...	100
Right inguinal	14	11	3	10	4	71
Left inguinal	14	11	3	13	1	93
Other situations ... ..	...	...	...	...	...	...
No buboes ... ..	...	...	...	...	...	...
Multiple buboes ... ..	...	...	...	...	...	...

TABLE VII.

Showing Pneumonic Plague (without Buboes).

Sexes.					Admitted.	Died.	Recovered.	Percentage of Mortality.
Males
Females
Children

TABLE VIII.

Showing Cases of secondary Plague Pneumonia (complicated with Buboes).

Sexes.					Admitted.	Died.	Recovered.	Percentage of Mortality.
Males
Females
Children

No. 16.

Report on the Thakordwar Lohana Plague Hospital, Bombay, from the 1st June 1899 to 31st May 1900.

This Hospital was first opened in the month of March 1897 in a Wadi belonging to the same community. This Wadi was turned into an hospital and it afforded accommodation for 35 patients. The standing expenditure is defrayed from a fund raised amongst the Lohana themselves. The contacts are kept in a large building attached to the hospital.

Names of Committee.

1. Mr. Haribhai Hemraj.
2. „ Cursondas Govindji.
3. „ Kalidas Jutha.
4. „ Govind Bhanji.

Medical Officer—Dr. V. S. Divan, L. M. & S.

There is one Hospital Assistant and 4 ward boys attached to the Hospital.

TABLE I.

Total Admissions during the Year.

Months.					Plague.	Relapsing Fever.	Observation cases, including all general diseases.	Total.
June ...	...	...	...	...	1	.....	.....	1
July ...	...	...	...	...	2	1	2	5
August ...	...	...	...	...	3	.....	1	4
September	...	...	...	...	.....	.....	1	1
October ...	...	...	...	...	2	.....	.....	2
November	...	...	...	...	3	.....	.....	3
December	...	...	...	...	8	1	.....	9
January	...	...	...	...	11	1	1	13
February	...	...	...	...	.....	.....	.....	.....
March...	...	...	...	...	6	.....	.....	6
April ...	..	...	...	...	3	.....	1	4
May ...	...	...	...	...	4	.....	1	5
Total ...					43	3	7	53

TABLE II.

	Admissions.	Deaths.	Recoveries.	Percentage of Mortality.
Plague	43	29	14	67
Relapsing Fever	3	2	1	66
Observation and other diseases	7	4	3	57
Total ...	53	35	18	.....

TABLE III.

Months.	Total Admissions.	Died within 24 hours.	Died within 48 hours.	Total Deaths.	Total Recoveries.	Percentage of Deaths.
June	1	1	66 P. C.
July	5	2	1	3	2	
August	4	...	...	3	1
September	1	1	...	1	...	
October	2	1	...	1	1	
November	3	...	1	1	2	
December	9	2	3	6	3	
January	13	2	2	7	6	
February ... ..	...	...	...	...	...
March	6	2	1	5	1	
April	4	1	...	3	1	
May	5	3	...	5	...	
Total ...	53	14	8	35	18	

TABLE IV.

	Total Admissions.	Deaths.	Recovery.	Percentage of Mortality.
Male... ..	24	18	6	75
Female	14	10	4	71.4
Children under 12 years	5	1	4	20

TABLE V.

Showing the Mortality for the Year amongst Sexes and Children.

Total Mortality for the year.	Mortality amongst Men.	Mortality amongst Women.	Mortality amongst Children (all under 12 years).
29	18	10	1

TABLE V (A.)

Percentage of Mortality amongst the following Ages.

Ages.	Percentage of Mortality.	Ages.	Percentage of Mortality.
2. 1 year to 10 years ...	25	5. 30 years to 40 years ...	55.5
3. 10 years to 20 „ ...	72.2	6. 40 „ and upwards ...	100
4. 20 „ to 30 „ ...	75		

TABLE VI.

Showing the Situation of Buboes.

Situation.	Total No. of cases.	Males.	Females.	Mortality.	Recoveries.	Percentage of Mortality.
Cervical	4	2	2	3	1	75
Paroid ... ..	.....	.....	.....	.....	.....	.....
Right axillary	4	2	2	3	1	75
Left axillary	1	1	.....	1	.....	100
Right femoral	18	10	8	10	8	55.5
Left femoral	15	8	7	12	3	80
Right inguinal	1	1	.....	.....	1	.....
Left inguinal ... ..	.....	.....	.....	.....	.....	.....
Other situation ... ..	.....	.....	.....	.....	.....	.....
No buboes ... ..	.....	.....	.....	.....	.....	.....
Multiple buboes ... ..	.....	.....	.....	.....	.....	.....

TABLE VII.

Showing Pneumonic Plague (without Buboes).

	Admitted.	Died.	Recovered	Percentage of Mortality.
Males
Females
Children

TABLE VIII.

	Admitted.	Died.	Recoveries.	Percentage of Mortality.
Males
Females
Children

As much has been said in the previous year's report on the epidemic it would be sufficient to mention here that this year's epidemic does not differ materially from the previous ones. The treatment is more or less symptomatic, but ice on the head and gland, wet-pack and stimulants have been found useful.

No. 17.

Report of Messrs. Greaves Cotton & Co.'s Plague Hospital, Worli, for the year ending 31st May 1900.

The idea of erecting a temporary Plague Hospital was for the benefit of the employés, who are helpless and poor. The Hospital sheds were erected in an excellent spot in Worli on the Municipal ground. There is one ward for plague patients with 12 beds and 7 sheds around it. One observation ward, one small-pox, one for contacts, two for evicts, one for dispensary and one servants' quarters. The accommodation in all is for 122 persons.

The staff of the Hospital consisted of:—

One Hakim.
 One Assistant.
 One Clerk.
 Four Sepoys.
 Two Ward boys.
 One Ward ayah.
 Two Sweepers.

There was no illness or death amongst the staff.

The water supply is received from the DeLisle Road main pipe.

The following five cases of plague previously inoculated with Prof. Haffkine's serum were admitted in the Hospital:—

Name.	Sex.	Age.	Caste.	Profession.	Date of Inoculation.	Date of Attack.	Result.
1. Kondia Rama ...	M.	10	Hindu ...	Mill-hand.	5-10-99	29-12-99	Recovered.
2. Din Mahad Shaikji.	M.	55	Mahomedan	,,	21- 2-00	25- 2-00	Died 26-2-00
3. John Continho ...	M.	16	Christian ...	Boy ...	12- 9-99	27- 3-00	Recovered.
4. Shaik Inart ...	M.	35	Mahomedan	Mill-hand.	21- 2-00	1- 4-00	Died.
5. Baboo Dhakin ...	M.	22	Hindu ...	,,	20- 1-00	15- 4-00	Recovered.

Out of 28 cases under observation 9 developed small-pox, out of these one died and 8 recovered. It must be mentioned here that the admission of small-pox cases in this Hospital was stopped by a letter No. 12578, dated 22nd January 1900, from the Special Medical Officer, Plague Operations.

The total number of deaths during the period under report was 16, out of which 12 were from plague, 3 from fever and one from small-pox.

Owing to the small number of deaths no weekly mortality can be shewn.

TABLE I.—*Showing Total admissions in Messrs. Greaves Cotton and Company's Plague Hospital during the year ending 31st May 1900.*

Months.	Plague.	Relapsing Fever.	Observation including all diseases.	Total.
December 1899	1	.....	5	6
January 1900	6	.....	20	26
February „	9	.....	.....	9
March „	2	.....	3	5
April „	4	.....	.....	4
May „	1	... ..	.....	1
Total	23	.....	28	51

TABLE II.

	Admissions.	Deaths.	Recoveries.	Percentage of Mortality.
Plague	23	12	11	52·1
Relapsing Fever... ..	.....	.....	.....	.....
Observation and other diseases	28	4	24	14·2
Total	51	16	35	31

TABLE III.—*Plague.*

Months.	Total Admis- sions.	Died within 24 hours.	Died within 48 hours.	Total Deaths.	Total Recoveries.	Percentage of Deaths.
December 1899	1	.....	.....	.....	1	.....
January 1900	6	1	.....	2	4	66·6
February „	9	2	3	7	2	77·7
March „	2	1	.....	1	1	50
April „	4	2	.....	2	2	50
May „	1	.....	.....	.....	1	.....

TABLE IV.

	Total Admissions.	Deaths.	Recoveries.	Percentage of Deaths.
Males	15	9	6	60
Females	4	2	2	50
Children under 12 years	4	1	3	25

Hindus.

	Total Admissions.	Deaths.	Recoveries.	Percentage of Deaths.
Males	9	6	3	66·6
Females	4	2	2	50
Children under 12 years	3	.....	3	.....

Mahomedans.

	Total Admissions.	Deaths.	Recoveries.	Percentage of Deaths.
Males	5	3	2	60
Females ... ..	.....	.....	.....	.....
Children under 12 years	1	1	.....	100

Christians.

	Total Admissions.	Deaths.	Recoveries.	Percentage of Deaths.
Male	1	.....	1	.....
Female ... ..	.....	.....	.....	.....
Children under 12 years ... ..	.....	.....	.....	.....

TABLE V.

Showing the Mortality for the Year amongst Sexes and Children.

Total Mortality for the year.	Mortality amongst Men.	Mortality amongst Women.	Mortality amongst Children.
16	1	4	1

TABLE VII.—*Showing Pneumonic Plague (without Buboes).*

	Admissions.	Deaths.	Recoveries.	Percentage of Mortality.
Male ... ..	.....	.....	.....	.....
Female	1	.....	1	.....
Children	1	.....	1	.....

No. 18.

Jain Hospital, Parel Road.

I beg to submit my report for the Parel Jain Plague Hospital for the year commencing from 1st June 1899 to 31st May 1900. There has been no change in the staff or building. We have already submitted last year our report with full particulars.

One case of inoculation by Haffkine's serum was cured. He was sent to us by Dr. Jayaker who inoculated him.

A ward boy and one Mehter, both died of phthisis.

N. F. PEREIRA,
Medical Officer.

TABLE I.

Total Admissions during the Year.

Months.	Plague.	Relapsing Fever.	Observation cases including all general diseases.	Total.
June 1899	2	...	1	3
July „	9	...	...	9
August „	8	1	1	10
September „	16	...	...	16
October „	28	...	...	28
November „	12	...	1	13
December „	13	...	1	14
January 1900	27	...	3	30
February „	32	...	1	33
March „	46	...	1	47
April „	31	...	3	34
May „	13	...	1	14

TABLE II.

	Admissions.	Deaths.	Recoveries.	Percentage of Mortality.
Plague	232	180	52	.....
Relapsing Fever	1	.....	1	75
Observation and other Diseases	13	8	5	.....
Total...	246	188	58	.....

TABLE III.

Months.	Total admissions.	Died within 24 hours	Died within 48 hours.	Total deaths.	Total recoveries	Percentage of deaths.
June 1899 ...	3	1	.....	2	1	66
July „ ...	9	.....	1	7	2	77
August „ ...	10	4	.....	8	2	80
September „ ...	16	5	2	11	5	66
October „ ...	23	2	5	17	6	75
November „ ...	13	5	3	11	2	85
December „ ...	14	5	1	9	5	65
January 1900 ..	30	10	2	21	9	70
February „ ...	33	3	6	21	12	64
March „ ...	47	11	4	37	10	80
April „ ...	34	10	6	30	4	88
May „ ...	14	3	.....	14	.....	100

TABLE IV.

	Total admissions.	Deaths.	Recoveries.	Percentage of deaths.
Males	189	147	42	78
Females	37	27	10	73
Children (under 12 years) ..	20	14	6	70

TABLE V.

Table showing the mortality for the year amongst sexes and children.

Total mortality for the year.	Mortality amongst men.	Mortality amongst women.	Mortality amongst children (all under 12 years of age).
188	147	27	14

TABLE V (A).

Percentages of Mortality amongst the following Ages.

No.	Age years.	Percentage of mortality.	No.	Age years.	Percentage of mortality.
1	Up to 1 years ...	100	4	20 years to 30 years ..	80
2	1 year to 10 years ...	80	5	30 „ „ 40 „ ..	50
3	10 years to 20 „ ...	60	6	40 and upwards...	62

TABLE VI.

Table showing the situation of buboes.

Situation.	Total No. of cases.	Males.	Females.	Mortality.	Recoveries.	Percentage of mortality.
Cervical	18	13	5	15	3	83.3
Parotid ... ..	...	...	...	...	...	...
Right axillary	41	32	9	33	8	80
Left axillary	25	23	2	20	5	80
Right femoral	49	43	6	38	11	77
Left femoral	39	33	6	31	8	75
Right inguinal	16	11	5	10	6	62.2
Left inguinal	16	12	4	14	2	87.2
Other situations ... ..	...	...	...	...	...	...
No buboes	28	25	3	19	9	56
Multiple buboes ... ..	...	...	...	...	...	...

TABLE VII.

Table showing Pneumonic Plague (without Buboes).

	Admitted.	Died.	Recovered.	Percentage of mortality.
Males	11	10	1	$90\frac{10}{11}$
Females ... ..	...	...	...	...
Children ... ..	...	...	...	...

TABLE VIII.

Table showing Cases of secondary Plague Pneumonia (complicated with Bubo).

	Admitted.	Died.	Recovered.	Percentage of mortality.
Males
Females
Children...

In conclusion I am prepared to send charts if required, for I will have to prepare the same. The pneumonic cases died as they all came to us very late ; only one recovered.

Report on the Dariasthan Lohana Plague Hospital, Bombay, from 1st June 1899 to 31st May 1900.

This hospital was first opened in April 1897 in Dariasthan Wadi situated at Dariasthan Street by Cutchi Lohanas for the benefit of their own community. It was then transferred to Clive Road, No. 131, at the foot of the Musjid Bridge.

Names of Committee.

Rao Bahadur Keshuvji Nathoo Sailor.

Kurumsi Danji, J.P.

Shet Motiram Jadhuvji.

Medical Officer—V. S. Dewan.

Hospital Assistant—V. G. Thakur.

And three ward boys attached to the hospital.

The present hospital building, a three-storied house, accommodates 22 patients while the contacts are kept in separate sheds specially erected for the purpose at Broach Street. On the first floor there is a dispensary, quarters for the Hospital Assistant, and cases under observation. On the second floor acute plague cases are kept, while the third is set apart for convalescent patients.

The water is supplied from the Municipal water pipes, and disinfection of clothes was carried on at District 3, B Ward South, with steam. The disinfectants usually employed were carbolic acid and corrosive sublimate. There were two cases of plague among the ward boys, but owing to immediate treatment both fortunately recovered.

TABLE I.

Total admissions during the year.

	Plague.	Relapsing Fever.	Observation cases including general disease.	Total.
From 1st June to 31st May 1900 ...	288	1	19	308

TABLE II.

	Admissions.	Deaths.	Recoveries.	Percentage of Mortality.
Plague	288	201	87	69·7
Relapsing fever	1	.....	1	.....
Observation and other diseases ...	19	6	13	30
Total...	308	207	102	66·9

TABLE III.

	Admissions.	Died within 24 hours.	Died within 48 hours.	Total Deaths.	Total Recoveries.	Percentage of Mortality.
From 1st June to 31st May 1900...	288	70	52	201	87	69·7

If the mortality within 24 hours is deducted percentage would be 64·6, and if the mortality within 48 hours is also deducted the percentage would stand at 53·6. This shows clearly that most of the cases or patients are brought in a moribund condition.

TABLE IV.

	Total Admissions.	Deaths.	Recoveries.	Percentage of Deaths.
Males	182	127	55	69·7
Females	76	56	20	73·6
Children (under 12 years)	30	18	12	60

TABLE V.

Total mortality for the year.	Mortality amongst men.	Mortality amongst women.	Mortality amongst children (all under 12 years of age).
201	127	56	18

TABLE V (A).

Percentage of Mortality amongst the following Ages.

No.	Ages.	Percentage of Mortality.
1.	Up to 1 year ... ..	.....
2.	1 year to 10 years	44·4
3.	10 years to 20 „	70·5
4.	20 „ to 30 „	66·6
5.	30 „ to 40 „	82·6
6.	40 „ and upwards ..	70

TABLE VI.

Table showing the situation of Buboes.

Situation.	Total No. of cases.	Males.	Females.	Mortality.	Recoveries.	Percentage of Mortality.
Cervical	12	8	4	11	1	91·6
Parotid	2	2	.....	2	.....	100
Right axillary	36	29	7	26	10	72·2
Left axillary... ..	11	10	1	8	3	72·7
Right femoral	67	46	21	44	23	65·6
Left femoral	92	71	21	59	33	64·1
Right inguinal	18	10	8	13	5	72·2
Left inguinal	18	12	6	12	6	66·6
Other situations ... ..	.....	.....	.....	.....	.....	.....
No buboes ... ..	.....	.....	.....	.....	.....	.....
Multiple buboes	6	3	3	3	3	50

TABLE VII.

Table showing Pneumonic Plague (without Buboes).

	Admitted.	Died.	Recovered.	Percentage of Mortality.
Males	18	15	3	83·3
Females	7	7	.....	100
Children ... ..	.....	.....	.....	.....

TABLE VIII.

Table showing Cases of secondary Plague Pneumonia (with Buboes).

	Admitted.	Died.	Recovered.	Percentage of Mortality.
Males... ..	.....	.....	.....	.....
Females	1	1	.....	100
Children ... ..	.....	.....	.....	.....

As much has been said in the previous years' reports on the epidemic it would be sufficient to mention here that this year's epidemic in no way materially differed from the previous ones. The type was as virulent, the chief symptoms being high fever, headache, vomiting and painful glandular enlargement. In the majority of cases of recovery the buboes suppurate and the treatment was more or less symptomatic, but ice on the head and gland, wet pack and stimulants have been found very useful.

V. S. DEWAN,
Medical Officer.

Report of the Jain Cutchi Dasa Oswal Plague Hospital from 26th of April 1900 to the 31st of May 1900.

History of the foundation of the Hospital.—The Hospital was opened on the 26th of April 1900 with the kind permission of the Municipal Commissioner and the Special Medical Officer, Plague Operations, Bombay.

This hospital was maintained solely by Mr. Jethabhai Damjee and its management looked after by Mr. K. H. Kayani.

At the request of the Proprietor and certain gentlemen of the above community, I had undertaken to act as an Honorary Chief Medical Officer, and the patients were visited twice daily. Besides this there was one paid Hospital Assistant doing the duties of a Resident Medical Officer.

Hospital Staff.—The following constituted the working staff of the Hospital :—

1 Chief Medical Officer.	1 Cook.
1 Resident Medical Officer.	1 Dhobie.
1 Compounder.	2 Mehtars.
3 Ward Boys.	

The Hospital.—The Hospital was situated in Mandvie at the corner where Tantanpura Street joins the Pydhownee Street. It consisted of one big ward, no dispensary and accommodation for the resident medical officer and servants. It was freely ventilated and provided accommodation for 24 patients.

Conservancy.—Attached to the Hospital there were three latrines. Special provision was made to receive faecal, urinary, and other discharges of the patients. As a matter of fact nothing was allowed to be disposed of by the mehtars unless subjected to strong antiseptics, such as strong solutions of perchloride of mercury, permanganate of potash and phenyle solutions.

Water-supply.—Tap water was used.

Sickness among the Staff.—None out of the Hospital Staff died and none were attacked with plague.

TABLE I.

Total Admissions during the Year.

Months.	Plague.	Relapsing Fever.	Observation cases including all general diseases.	Total.
From 26th April 1900 to 31st May 1900.	13	...	1. (Malarial Fever.)	14

Remarks.—The patients admitted were generally of the middle and poor class, and were all voluntary admissions ; but they were generally sent to the Hospital when severe symptoms had set in, *i.e.*, majority of the patients admitted were in a state of either exhaustion or collapse. Half the number of the patients were treated by their own native vaid, but proved fatal.

None of the patients treated in this Hospital were previously inoculated by Prof. Haffkine's plague prophylactic.

TABLE II.

—					Admissions.	Deaths.	Recoveries.	Percentage of Mortality.
Plague ...	...	...	...	...	13	10	3	·76
Relapsing Fever	...	...	...	...	...	...	...	...
Observation and other diseases...	...	...	...	...	1	...	1	...
Total					14	10	4	·64

TABLE III.

Months.	Total Admissions Plague.		Died within 24 hours. Plague.	Died within 48 hours.	Total Deaths.	Total of Recoveries.	Percentage of Mortality.
April	4	1	2	4	...	·100
May	9	1	2	6	3	·66

TABLE IV.

				Total Admissions.	Deaths.	Recoveries.	Percentage of Deaths.
Males	...	...	...	5	2	3	·40
Females	...	...	...	5	5	...	·100
Children (under 12 years)	...	...	...	3	3	...	·100

TABLE V.

Table showing the Mortality for the Year amongst Sexes and Children.

Total mortality for the year.	Mortality amongst men.	Mortality amongst women.	Mortality amongst children (all under 12 years of age).
10	2	5	3

TABLE V (A).

Percentage of Mortality amongst following Ages.

No.	Age.	Percentage of mortality.	No.	Age.	Percentage of mortality.
1	Up to 1 year ...	...	4	20 years to 30 years ...	·80
2	1 year to 12 years ...	·100	5	30 „ to 40 „ ...	·100
3	12 years to 20 „ ...	·33	6	40 „ and upwards ...	...

TABLE VI.

Table showing the Situation of Buboos.

Situation.	Total No. of cases.	Males.	Females.	Mortality.	Recoveries.	Percentage of Mortality.
Cervical	1	1	...	1	...	100
Right axillary	3	3	...	3	...	100
Left axillary	5	3	2	4	1	80
Right femoral	1	1	...	...	1	...
Left femoral	3	1	2	2	1	66
Multiple buboes, if any ... ..	...	...	...	...	...	...

In one female patient Prof. Lustig's serum was used, but the case proved fatal.

DINANATH BALKRISHNA NAIK, L. M. & S.,

Hony. Chief Medical Officer.

No. 21.

**Report on the Narielwadi Musalman Hospital,
Bombay, from 1st June 1899 to 31st May 1900.**

This Hospital was opened by the Municipality for the convenience of the Narielwadi Village Mahomedans only at their request on the 19th December 1899.

The patients were all under the treatment of a Hakim and the undersigned was put in charge of the hospital to look to the sanitary arrangements, cleanliness of the wards, disinfection of patients' clothes and for general supervision.

The Hospital is situated on the southern border of the new Victoria Road and on the east of the Mahomedan Burial Ground at Tank Bunder. It is open on all sides, and consists of an oblong shed about 70 feet long and 25 feet broad. The walls are of bamboo mattings with ventilating shutters of the same material both at the top and bottom all round. It was divided into two wards, one for males and the other for females by a moveable partition. At the northern corners two rooms, each about 10 feet square, were kept for isolation of pneumonic plague patients. About 30 feet apart from the hospital on the west as well as on the south are two contact sheds capable of accommodating about 100 contacts.

The patients were allowed to be nursed by their friends or relatives who had to follow all sanitary regulations as required by the undersigned.

Feeding the patients was also arranged by the patients or their relatives and so no staff was engaged for the purpose.

The hospital can accommodate 20 patients at a time.

Conservancy.—Two seats of latrines—one for males and one for females—were built for the exclusive use of the contacts only. A Bhungi was specially deputed from

the Narielwadi Camp staff to keep the latrines clean and disinfected. The cleanliness of the latrines and of the Hospital compound was also supervised by the Narielwadi Camp Master, Mr. Row.

The patients had to use bed pans and in these, at the time of using them, always a solution of perchloride of mercury was put in. The excreta of the patient was immediately removed by the Bhungi; and, after disinfecting the same with a solution of perchloride of mercury, was put in iron pans and removed to the Municipal night-soil depôt.

The compound of the hospital was cleaned and swept twice daily by a sweeper from the Narielwadi staff and the rubbish was burnt, or in case of mud sweeping, was disinfected with perchloride of mercury solution before its removal to the carts.

The water-supply was derived from the Municipal water pipe of the Victoria Road.

The floor of the hospital being of mud was daily sprinkled with lime and carbolic powder.

The clothes of the patients as well as of the persons nursing them were daily disinfected by sterilization at the Narielwadi Camp sterilizer.

Immediately after the death of a patient the body was removed to the mortuary which is situated at the south-east corner of the hospital compound. The clothes and bed sheets of the deceased patient were in all cases destroyed by burning. The blankets were disinfected by the sterilizer.

Free use of carbolic soap was made in washing the body before carrying it to the burial ground.

None of the patients that come to the hospital were found to be paupers. None of the patients were previously injected with Haffkine's serum. No death or sickness occurred amongst either the staff or the persons nursing the patients.

TABLE I.—*Showing total Admissions.*

Month.	Plague.	Relapsing Fever.	Observation Cases.	Total.
January	4	.....	.....	4
February	3	.....	1	4
Total ...	7	.....	1	8

TABLE II.

	Admissions.	Deaths.	Recovery.	Percentage of Mortality.
Plague	7	3	4	42·8
Relapsing fever ... ..	.....	.....	.....	.....
Observation and other diseases	1	.....	1	100

TABLE III.—*Plague.*

Month.	Total Admissions.	Died with- in 24 hours	Died with- in 48 hours	Total Deaths.	Total Recoveries.	Percentage of Deaths.
January	4	.....	1	1	1	25
February	3	2	.....	2	2	66·3
March ... ..	.....	.....	.....	.....	1	.....
Total ...	7	2	1	3	4	.....

TABLE IV.—*Plague.*

	Total Admissions.	Deaths.	Recoveries.	Percentage of Deaths.
Males	5	2	3	40
Females	2	1	1	50
Children under 12 years ...	.....	.....	.....	.....
Total ...	7	3	4	.....

TABLE V.

Total Mortality for the year.	Mortality amongst Men.	Mortality amongst Women.	Mortality amongst Children.
3	2	1	.....

TABLE VI.—*Showing Situation of Buboes.*

Situation.	Total No. of Cases.	Males.	Females.	Mortality.	Recovery.	Percentage of Mortality.
Cervical ... ..	.....	.....	.....	.....	.....	.....
Parotid ... ..	.....	.....	.....	.....	.....	.....
Right axillary ... ..	.....	.....	.....	.....	.....	.....
Left axillary	1	.....	1	1	.....	100
Right femoral ... ..	.....	.....	.....	.....	.....	.....
Left femoral ... ..	.....	.....	.....	.....	.....	.....
Right inguinal	2	2	.....	1	1	50
Left inguinal	4	2	1	1	3	25
Other situations ... ..	.....	.....	.....	.....	.....	.....
No buboes ... ..	.....	.....	.....	.....	.....	.....
Multiple buboes ... ..	.....	.....	.....	.....	.....	.....

As there were no cases of pneumonic plague or of secondary plague pneumonia Tables VII and VIII are omitted.

Notes on symptoms and character of the disease.—One remarkable feature observed was that all the cases that recovered were admitted shortly after the attacks and that all the fatal cases were those that had very far advanced and were already in a very critical condition. On the 9th of March 1900 the last patient was discharged recovered, and since then there were no further admissions.

S. N. ABADAN,

S. M. O., Ghorupdeo,

in charge Narielwadi Mahomedan Hospital.

No. 22.

Report on working of the Kolsa Moholla Mahomedan Plague Hospital for the period 1st July 1899 to 30th June 1900.

History.—This was the first hospital started in Bombay in the very locality of the people for whom it was intended in April 1897.

It is located like other Mahomedan Hospitals in the Jamat Khana or dining hall.

The following comprises the Hospital Board :—

- (a) Khan Saheb Haji Ebrahim Haji Sumar Patel, *Chairman*.
- (b) Sirdar Khan Bahadur Cassum Mitha, J.P.
- (c) Haji Ebrahim Haji Ahmed Patel.
- (d) Mr. Ali Mahomad Abba Juma, J.P.
- (e) Haji Usman Haji Abba, *Secretary*.

Hospital Establishment.

- (a) 1 Hospital Assistant.
- (b) 4 Ward boys.
- (c) 1 Cook, 1 sweeper and 1 dhobi.

Expense.—The expenses incidental to the working of the hospital are incurred out of the Jamat Fund, collected by a sort of income-tax.

Building.—It is a three-storied building open only to the west and has three stories with a ground floor. The last is utilized as a store and cook-room and has accommodation for servants, the first story is utilized as Observation Ward, as well as accommodation for contacts, *i.e.*, half floor for cases of observation and half for contacts. The cases of plague were comparatively small in the community, therefore the accommodation in the hospital was quite enough in case of more plague amongst the Jamat.

General Gatacre's Committee undertook the construction of water-closets and water-pipes. The expenses amounted to about 1,800 rupees, half of which were paid out of the Jamat Funds and the other half by the Municipality. There are flushing tanks connected with the latrines.

Water Supply.—It is drawn out of pipes erected on each floor by the Plague Committee in April 1897.

Disinfection.—Whenever there are patients the wards are treated with phenyle solution and the flooring washed with lime. This year the linen and clothing as well as bedding soiled by patients have been all destroyed.

Disposal of Dead.—On a patient's dying he or she was taken to the back of the ward and there dressed and put into the coffin and taken to the burial ground.

No sickness occurred among the hospital staff.

General Remark.—This year patients were allowed to be treated by their own doctors. Only 4 patients were admitted into the hospital, out of which 3 died and one was discharged.

I append herewith the necessary tables called forth in the Circular.

KHAN SAHEB H. EBRAHIM H. SUMAR PATEL, J. P.
Chairman, Kolsa Moholla Mahomedan Plague Hospital,

TABLE I.
Total Admissions during the Year.

Months.	Plague.	Relapsing Fever.	Observation Cases including all general diseases.	Total.
July ... ..	.....	.....	.....	.....
August ... ..	.....	.....	.....	.....
September ... ..	.....	.....	.....	.....
October ... ..	.....	.....	.....	.....
November ... ..	.....	.....	.....	.....
December ... ..	.....	.....	.....	.....
January ... ..	.....	.....	.....	.....
February	1	.....	.....	1
March ... ..	.....	.....	.....	.....
April... ..	1	.....	.....	1
May	1	.....	.....	1
June	1	.....	.....	1

TABLE II.

—	Admissions.	Deaths.	Recoveries.	Percentage of Mortality.
Plague	4	3	1	75
Relapsing fever ... ..	.....	.....	.....	.....
Observation and other diseases.	.....	.....	.....	.....
Total ...	4	3	1	75

TABLE III.

Months.				Total Admissions.	Died within 24 hours.	Died within 48 hours.	Total Deaths.	Total Recoveries.	Percentage of Deaths.
July	...	...	...	.....	.....	.....	.....	.....	.....
August	...	...	...	.....	.....	.....	.....	.....	.....
September	...	...	...	.....	.....	.....	.....	.....	.....
October	...	...	...	.....	.....	.....	.....	.....	.....
November	...	...	...	.....	.....	.....	.....	.....	.....
December	...	...	...	.....	.....	.....	.....	.....	.....
January	...	...	...	.....	.....	.....	.....	.....	.....
February	...	...	...	1	1	.....	1	.....	100
March	...	...	...	.....	.....	.....	.....	.....	.....
April	...	...	...	1	.....	.....	.....	.....	.....
May	...	...	...	1	.....	.....	1	1	50
June	...	...	...	1	.....	1	1	.....	100

TABLE IV.

				Total Admissions.	Deaths.	Recoveries.	Percentage of Deaths.
Males	...	...	...	3	2	1	66
Females	...	...	...	1	1	.....	100
Children under 12 years	...	...	...	.....	.....	.....	.....

TABLE V.

Table showing the Mortality for the Year amongst Sexes and Children.

Total Mortality for the Year.	Mortality amongst Men.	Mortality amongst Women.	Mortality amongst Children all under 12 years of age.
3	2	1	.....

TABLE VI.

Table showing the Situation of Buboes.

Situation.	Total No. of cases.	Males.	Females.	Mortality.	Recoveries	Percentage of Mortality.
Cervical	1	1	.....	.....	1	.....
Parotid ... ..	.....	.....	.....	.....	.....	.....
Right axillary	1	.....	1	1	.....	100
Left axillary ... ..	.....	.....	.....	.....	.....	.....
Right femoral	1	1	.....	1	.....	100
Left femoral ... ..	.....	.....	.....	.....	.....	.....
Right inguinal	1	1	.....	1	.....	100
Left inguinal ... ..	.....	.....	.....	.....	.....	.....
Other situations ... ..	.....	.....	.....	.....	.....	.....
No buboes ... ..	.....	.....	.....	.....	.....	.....
Multiple buboes ... ..	.....	.....	.....	.....	.....	.....

TABLE VII.

Table showing Plague (without Buboes).

	Admitted.	Died.	Recovered.	Percentage of Mortality.
Males
Females
Children

TABLE VIII.

Table showing Cases of secondary Plague Pneumonia complicated with Buboes.

	Admitted.	Died.	Recovered.	Percentage of Mortality.
Males
Females
Children

No. 23.

Report on the V. S. Maharaja Servants' Plague Hospital, Bombay, from the 1st June to the 31st May 1900.

The hospital was opened in the beginning of 1897 by the priests of Vaishnava Sampradaya. The medical officer for the year 1897-98 was Dr. Missir, L. M. & S., whilst during the years 1898-99 and 1899-1900 Dr. C. F. Dalal, L. M. & S., was in charge. The hospital had on its establishment in addition one compounder and one ward boy from the beginning to the end.

The hospital is situated in the open area near the Satswarup's palace at the end of Panchayat's wadi. There are 7 beds, 4 for acute cases, and 3 for convalescent ones. The dispensary is situated on the ground floor of the above palace with servants' quarters attached to it.

The excreta and the patients' clothes and beddings were all burnt.

Water is supplied from the well attached to the palace above referred to.

The wards and the quarters were disinfected by ordinary carbolic lotion and lime-washed every now and then when necessary.

All the dead were burnt at the Sonapur Cemetery. The mortuary was situated a little further from the hospital in the same compound, having corrugated iron sheet walls and roof. It was also lime-washed and disinfected when necessary.

All refused inoculation. None of the admitted was previously inoculated.

None of the staff neither fell ill nor died.

TABLE I.—*Total Admissions during the Year.*

Months.	Plague.	Relapsing Fever.	Observation cases.	Total.
February	4	.....	.....	4
March	4	.....	1	5
April... ..	1	.....	1	2

Two patients were admitted on 26th February 1899, and the same number on the following day also. Two patients were admitted on 26th March 1899.

The total number of deaths during the year was six. The total number of deaths from plague was five. Percentage of deaths to admissions was 54·5.

No particular day can be mentioned recording the largest number of deaths.

TABLE II.

	Admissions.	Deaths.	Recoveries.	Percentage of Mortality.
Plague	9	5	4	55·5
Relapsing fever ... ..	.....	.....	.....	.....
Observation and other diseases	2	1	1	50
Total ...	11	6	5	.....

TABLE III.

Months.	Total admissions.	Died within 24 hours.	Died within 48 hours.	Total Deaths.	Total Recoveries.	Percentage of deaths.
February ...	4	1	1	2	2	50
March ...	5	1	...	2	3	40
April... ..	2	1	1	2	...	100

TABLE IV.

	Total admissions.	Deaths.	Recoveries.	Percentage of deaths.
Males	10	6	4	60
Females	1	.....	1	.....
Children (under 12 years) ...	.....	.....	.....	.....

TABLE V.

Table showing the Mortality for the Year amongst Sexes and Children.

Total mortality for the year.	Mortality amongst men.	Mortality amongst women.	Mortality amongst children (all under 12 years of age).
6	6	.....	.....

TABLE V (A).

Percentage of Mortality amongst the following Ages.

No.	Ages.	Percentage of mortality.	No.	Ages.	Percentage of mortality.
1	Up to 1 year ...	.....	4	20 years to 30 years ...	60
2	1 year to 10 years ...	.....	5	30 „ to 40 „ ...	50
3	10 years to 20 „ ...	50	6	40 „ and upwards ...	50

No bacteriological examination was ever made.

The treatment of the disease was merely a stimulant one as in ordinary acute pneumonia, particular attention being paid to nursing.

No curative serum of Roux and Lustig was ever used as it was never provided.

No temperature charts were ever used.

C. F. DALAL, L. M. & S.,

Chief Medical Officer,

V. S. Maharaja Servants' Plague Hospital.

No. 24.

Report on the Brahma Kshatri Plague Hospital, Bombay, from the 1st June 1899 to 31st May 1900.

This Hospital was first set on foot in the year 1898. It was kept open for only 4 months each year, namely, during the time when the disease was in its epidemic form.

Vithaldas Parshotamdas, Manager ; Dr. V. S. Divan, Chief Medical Officer ; Nagindas Shirlal Mody, Hospital Assistant ; Luxmanrao G., compounder ; and there were two ward boys attached to the Hospital.

This year it was re-open at the request of the Members of the community under the management of Mr. Vithaldas Parshotamdas for the benefit of the Brahma Kshatriya caste. The balance of the funds was swelled this year by donations from generous members of the caste towards the maintenance of the hospital which was closed after being kept open for four months, viz., February, March, April and May.

A wadi belonging to the same community was turned for the time being into a hospital.

The contacts were kept in a wadi especially kept apart for the purpose in the Panjrapole Lane, close to the hospital.

As much has been said in the two previous years reports on the epidemic, it would be sufficient to mention here that this year's epidemic in no way materially differed from the two previous ones. The type was as virulent, the chief symptoms being high fever, headache, vomiting and glandular enlargements. In the majority of cases of recovery the buboes suppurate, the treatment was more or less symptomatic, but ice on the head and gland, wet-pack and stimulants have been found useful.

TABLE I.

Total Admissions during the Year.

Months.	Plague.	Relapsing fever.	Observation cases, including all general diseases.	Total.
4	42	.....	.....	42

TABLE II.

	Admissions.	Deaths.	Recoveries.	Percentage of mortality.
Plague	42	28	14	66·28
Relapsing fever ... ..	.....	.....	.....	.....
Observation and other diseases ... ..	.....	.....	.....	.....
Total ...	42	28	14	.....

TABLE III.

Months.	Total admissions.	Died within 24 hours.	Died within 48 hours.	Total deaths.	Total Recoveries.	Percentage of deaths.
January ...	6	2	1	4	<i>Nil</i>	66·4
February ...	8	4	1	6	2	75·4
March ...	11	2	2	6	2	54·6
April ...	11	2	...	2	4	18·2
May	6	4	5	10	6	62·5

TABLE IV.

	Total admissions.	Deaths.	Recoveries.	Percentage of Deaths.
Males	28	17	11	60·20
Females	11	10	1	90·10
Children (under 12 years)	3	1	2	33·1

TABLE V.

Table showing the Mortality for the Year amongst Sexes and Children.

Total mortality for the year.	Mortality amongst men.	Mortality amongst women.	Mortality amongst children (all under 12 years of age).
28	17	10	1

TABLE V. (A).

Percentage of Mortality amongst the following Ages.

No.	Age years.	Percentage of mortality.	No.	Age years.	Percentage of mortality.
1	Up to 1 year ...	...	4	20 years to 30 years...	83·4
2	1 year to 10 years.	...	5	30 „ „ 40 „ ...	...
3	10 years to 20 „ ...	57·1	6	40 „ and upwards ...	55·5

TABLE VI.

Table showing the Situation of Buboes.

Situation.	Total of cases.	Males.	Females.	Mortality.	Recoveries.	Percentage of mortality.
Cervical ...	1	1	...	1	...	.....
Parotid ...	...	...	...	...	...	.....
Right axillary ...	6	4	2	5	1	83·2
Left axillary ...	2	1	1	1	1	50·
Right femoral ...	14	10	4	10	4	7·2
Left femoral ...	13	12	1	10	3	7·9
Right inguinal ...	4	2	2	...	3	25·
Left inguinal ...	2	1	1	1	2	.....
Other situations ...	...	...	...	...	...	.....
No buboes ...	...	...	...	...	...	.....
Multiple buboes ...	...	...	...	...	...	.....

TABLE VII.

Table showing Pneumonic Plague (without Buboes).

—	Admitted.	Died.	Recovered.	Percentage of Mortality.
Males
Females
Children

TABLE VIII.

Table showing Cases of secondary Plague Pneumonia (complicated with Buboes).

—				Admitted.	Died.	Recovered.	Percentage of Mortality
Males
Females
Children

No. 25.

Report on the Jain Plague Hospital, Lall Bag, Pijrapole.

I respectfully beg to submit the following report from the 1st of June 1899 to the 31st of May 1900 according to the lines indicated in your instruction sheet.

The information regarding the history of the foundation of the Hospital, &c., is supplied in the last year's report.

Medical Officer.

Maganlal Umiashankar Bhatt, L. M. & S.

List of Medical Staff.

Hospital Assistant—Sadashiv Vishnu.

Compounder—Kashinath Vasudev.

Nurse—Gangabai Sudin.

There were 7 ward boys, 1 servant, 1 barber, 1 Brahmin cook and 1 halalkore till about the middle of June 1900. Since the 1st July 1900 there are 2 ward boys and 1 halalkore with 1 Hospital Assistant.

The information regarding the queries Nos. 3, 4, 5, 6 and 7 is furnished in the last year's report.

There was only one case of plague previously inoculated with Prof. Haffkine's prophylactic admitted into the Hospital.

Name—Nursing Rupa.

Sex—Male.

Age—33 years.

Residence.—House No. 238, Jamli Mohollah, Null Bazaar. Out of Fort.

Date of inoculation—12th December 1899.

Date of attack by plague—17th February 1900.

Date of discharge—4th March 1900.

Amongst the Hospital Staff all enjoyed good health excepting the nurse Gangabai and one ward boy Raghunath Keshav.

The nurse was on leave from the 18th January 1900 and went to live at her own place in Camatipura. She got a mild attack of bubonic plague on the 31st March 1900, and was admitted into this Hospital on the 2nd April 1900 and was discharged cured on the 17th April 1900.

The ward boy Raghunath was living in the Hospital quarters for the servants. He got a severe attack of bubonic plague on the 28th March 1900 and died within four days.

TABLE I.

Total Admissions during the Year.

Months.					Plague.	Relapsing Fever.	Observation cases includ- ing all general diseases.	Total.
June ...	...	...	...	...	4	.....	1	5
July ...	...	...	...	...	7	.....	.....	7
August	...	...	...	...	12	.....	4	16
September	...	...	...	...	9	.....	.....	9
October	...	...	...	...	12	.....	.....	12
November	...	...	...	...	16	.....	.....	16
December	...	...	...	...	23	.....	.....	23
January	...	...	...	...	39	.....	1	40
February	...	...	...	...	27	.....	.....	27
March	...	...	...	...	22	.....	1	23
April ...	...	...	...	...	27	.....	2	29
May ...	...	...	...	...	11	.....	1	12
					209	.....	10	219

Largest number of admission 1st week of April 1900 (from

the 31st March to 6th April 13

Largest number of admission on 8th January 1900 ... 5

Total number of deaths during the year... .. 160

Total number of deaths from Plague during the year... 159

Total number of weekly deaths 159

Total percentage of deaths to admissions 73·05

Largest number of deaths on 9th January 1900... .. 4

TABLE II.

					Admissions.	Deaths.	Recoveries.	Percentage of Mortality.
Plague	...	...	...	...	209	159	50	76·07
Relapsing fever	...	...	...	...	.....	.....	.....	.....
Observation and other diseases	...	...	...	...	10	1	9	10
Total					219	160	59	73·05

TABLE VI.

Table showing the Situation of Buboes.

Situation.	Total No. of cases.	Males.	Females.	Mortality.	Recoveries.	Percentage of Mortality
Cervical	6	5	1	4	2	66·6
Parotid	1	1	.....	.....	1	.....
Right axillary	19	16	3	15	4	78·94
Left axillary	22	17	5	14	8	63·63
Right femoral	55	51	4	42	13	76·36
Left femoral	49	47	2	41	8	83·63
Right inguinal	13	12	1	9	4	69·23
Left inguinal	12	9	3	7	5	58·3
Other situation, viz., Poplital..	1	1	.....	.....	1	.....
No buboes ... ..	.....	.....	.....	.....	.....	.....
Multiple buboes	21	19	2	18	3	85·71

TABLE VII.

Table showing Pneumonic Plague (without Buboes).

	Admitted.	Died.	Recovered.	Percentage of Mortality.
Male	10	9	1	90·0
Female ... ..	.....	.....	.....	.....
Children ... ..	.....	.....	.....	.....

TABLE VIII.

Table showing Cases of secondary Plague Pneumonia (complicated with Buboes).

	Admitted.	Died.	Recovered.	Percentage of Mortality.
Males	23	18	5	78·26
Females	3	2	1	66·6
Children	1	1	.....	100

Secondary pneumonia mostly supervened during the first week of the disease, and in some cases it was observed to supervene during the second or even the third week of the disease.

Information regarding the symptoms, character and treatment of plague, as well as its complications and sequelæ is supplied in the last year's report. I have this year, in case of a pneumonic plague, as well as of plague with secondary pneumonia given doses of the tincture of belladonna, varying from minim 10 to 20, every 2 hours, when there was extreme dyspnoea, with marked improvement in this symptom.

There were during the year 10 cases of fever under observation, viz., 5 of simple remittent type, 4 of remittent fever, complicated with bronchitis and one of remittent fever, complicated with double pneumonia. The last one terminated in death, while the rest were discharged cured.

During the year there was no case of plague under treatment by the curative serum of Reux and Lustig.

MAGANLAL U. BHATT, L. M. & S.

No. 26.

Report on the 3rd Bhoiwada Plague Hospital, Bombay from 1st June 1899 to 31st May 1900.

This Hospital was first opened on the 1st May 1897 by Sorathia and Nagar Banias for the benefit of their own communities through the exertion of Mr. Kababhai Virchund.

Names of Committee.

- 1 Mr. Kababhai Virchund.
- 2 „ Nagindas Dwarkadas.
- 3 „ Gulabdas Gangadas.

Medical Officer.

Dr. V. S. Divan, L. M. & S.

There is one hospital assistant and four ward boys attached to the hospital and it is maintained from the general fund raised by the Sorathia and Nagar Banias among themselves.

The wadi, an open building set apart for caste meetings and feasts, is temporarily converted into an hospital with accommodation for 15 patients, the contacts being accommodated in a similar wadi just opposite.

The water was supplied from the Municipal water pipe and the disinfection of clothes was carried on the hospital premises; the disinfectants mostly used were carbolic acid and corrosive sublimate.

Inoculation Cases.

No.	Namcs.	Sex.	Age. Years.	Admitted.	Inoculated.
1	Luximiram Tribhuven ...	Mae.	32	6th March 1900 ...	21st December 1899. Dr. Purshotum Harichund, L. M. & S.
2	Nurshiram Tribhuven ...	,,	22	29th April 1900 ...	2nd January 1900, Dr. Purshotum Harichund L. M. & S.

Both patients recovered.

There was no sickness amongst the hospital staff, though most of the servants used to live on the hospital premises.

TABLE I.

Total Admissions during the Year.

Months.	Plague.	Relapsing Fever.	Observation cases including all general diseases.	Total.
1st June 1899 to 31st May 1900 ...	156	Nil	2	158

TABLE II.

	Admissions.	Deaths.	Recoveries.	Percentage of Mortality.
Plague	156	117	39	75
Relapsing fever... ..	.....	.....	.....	.....
Observation and other Diseases	2	1	1	.....
Total ...	158	118	40	.....

TABLE III.

Month.	Total admission.	Died within 24 hours.	Died within 48 hours.	Total deaths.	Total recoveries.	Percentage of deaths.
June	1	.....	.....	1	.....
July	1	.....	.....	1	.....
August	2	1	1	2	.....
September	5	2	.....	5	.....
October	2	.....	.....	2	.....
November	4	.....	1	2	.....
December	12	4	3	9	2	
January 1900.	35	6	5	24	6	
February	43	9	8	28	8	
March	31	6	9	26	9	
April	14	3	1	11	7	
May	6	.....	.....	5	7	
Total ...	156	31	28	117	39	

The total mortality is 75 per cent., but if the mortality within 24 hours is deducted, the percentage would be 68·9, and if the mortality within 48 hours is also deducted, the percentage would stand at 59·7.

TABLE IV.

	Total admission. Plague.	Deaths.	Recoveries.	Percentage of mortality.
Males	114	90	24	78·9
Females	81	20	11	64·5
Children under 12 years	11	7	4	63·6

TABLE V.

Table showing the Mortality for the Year amongst Sexes and Children.

Total mortality for the year.	Mortality amongst men.	Mortality amongst women.	Mortality amongst children (all under 12 years of age).
117	90	20	7

TABLE V (A).

Percentage of Mortality amongst the following Ages.

Age.	Percentage of Mortality.
1. Up to 1 year ... ..	.....
2. 1 year to 10 years	57·1
3. 10 " " 20 "	70·6
4. 20 " " 30 "	75·
5. 30 " " 40 "	85·
6. 40 and upwards	81·4

TABLE VI.

Table showing the Situation of Buboes.

Situation.	Total number of cases.	Males.	Females.	Mortality.	Recoveries.	Percentage of mortality.
Cervical ... ..	.....	.....	.....	.....	.....	.....
Parotid ... ..	.....	.....	.....	.....	.....	.....
Right axillary	29	22	7	22	7	75·8
Left axillary	10	8	2	8	2	80·
Right femoral	51	40	11	39	12	76·4
Left femoral	37	28	9	26	11	72·9
Right inguinal	10	6	4	7	3	70·
Left femoral	1	1	.....	.....	1	.....
Other situations ... ..	.....	.....	.....	.....	.....	.....
No buboes ... ..	.....	.....	.....	.....	.....	.....
Multiple buboes	5	3	2	4	1	80·

TABLE VII.

Table showing Pneumonic Plague (without Buboes).

					Admitted.	Died.	Recovered.	Percentage of mortality.
Males	...	...	...	...	13	11	2	85.2
Females	...	...	...	...	.....	.....	.....	.....
Children	...	...	...	...	.....	.....	.....	.....

TABLE VIII.

Table showing Cases of secondary Plague Pneumonia (complicated with Buboes).

					Admitted.	Died.	Recovered.	Percentage of mortality.
Males
Females
Children

As much has been said in the reports of the previous years, it would be sufficient to mention here that this year's epidemic no way materially differed from the previous ones. In the majority of cases of recovery the buboes suppurate and the treatment was more or less symptomatic.

V. S. DIVAN.

No. 27.

Report on the Hindu Fever (Plague) Hospital, Bombay, from the 1st June 1899 to 31st May 1900.

The history of the foundation of the Hospital has been given in detail in the Report submitted last year. When the third epidemic of plague was nearly at an end by the middle of June 1899, the Hospital Committee ceased to admit patients regularly as before, but as plague had not entirely disappeared from the city cases used to occur now and then, and people residing in D. Ward liked to take advantage of the semi-permanent sheds of the Hospital and sought admission in them, making their own arrangements with regard to the food, attendance and medical treatment required for the patients. During this period of nearly 6 months the Hospital staff consisted only of one dresser, one ward-boy, one ramoshi and one bhangî. The Resident Medical Officer, though his services were dispensed with temporarily by the Committee on account of reduction in the staff, was kind enough to stay on the premises of the Hospital and work as before without any remuneration.

As the Honorary Chief Medical Officer of the Hospital I had to visit it often, even during this period, as the majority of the patients admitted were kept under my treatment either solely or in consultation with other medical men. During this period of 8 months 93 patients were treated in this way, as will be seen from Table No. 1.

2. Later on, in the month of January 1900, when the plague assumed epidemic proportions for the fourth time and went on increasing, the Committee of the Hospital, with their usual readiness and promptitude, resolved to re-open the Hospital

from the 1st February 1900. Some new sheds were erected and the Hospital was well equipped with all the necessary requisites. As the Hospital has been maintained by private subscriptions the Committee could not conveniently afford to admit an unlimited number of patients into the Hospital, and hence it was resolved to admit patients till the total number of the in-patients did not exceed 30 on any day.

Staff.

Honorary Chief Medical Officer	...	...	...	...	...	1
Resident Medical Officer	...	...	...	...	...	1
Compounder	...	...	...	...	...	1
Dresser	...	...	...	...	...	1
Ward-boys	...	...	...	...	...	4
Ayahs	...	...	...	...	...	2
Cook	...	...	...	...	...	1
Store-keeper	...	...	...	...	...	1
General servant	...	...	...	...	...	1
Ramoshis	...	...	...	...	...	2
Bhangis	...	...	...	...	...	3

The number of the ward-boys and ayahs varied from time to time according to the number of patients present in the Hospital.

The office-bearers are the following :—

Tribhuvandas Mangaldas Nathubhai, Esq., President of the Managing Committee.

Vijbhukandas Atmaram, Esq., Chairman of the Executive Committee.

Sir Bhalechandra Krishna (also Consulting Physician) ...

Janardhan Gopal, Esq.	}	Honorary Secretaries.
Rao Bahadur Narayan T. Vaidya	...	...	...	...	...
S. D. Khote, Esq....	...	...	...	...	...
D. G. Padhye, Esq.	...	...	...	...	...

D. G. B. Kher, Honorary Chief Medical Officer.

Harischandra P. Pitale, Esq., Treasurer.

M. R. Bodas, Esq.	}	Auditors.
Gangadhar Dewji, Esq.		

3. The disposition and arrangement of the wards was nearly the same as described in the last year's Report. The temporary sheds that were pulled down during the last rains were erected again. Quarters for the resident members of the staff as well as sheds for contacts were provided as before. In addition to the three semi-permanent sheds already existing two new sheds of the same nature were erected specially for accommodating the Maratha patients, one by Shet Damodar Gordhandas Sukhadwalla and one by Rao Bahadur N. T. Vaidya.

4. Conservancy arrangements were carried out as described in previous Reports.

5. Water is supplied from taps supplied by the Municipality.

6. The wards were disinfected as described in the previous Reports.

The clothes were sent once every day in a cart for being disinfected by the steam-disinfector to the Northbrook Municipal Camp and they were kept under steam for nearly twenty minutes for the purpose.

7. The arrangements regarding the disposal of the dead, claimed as well as unclaimed, were the same as described in the last year's Report. Discretionary relief

grant, placed at the disposal of Rao Bahadur Narayan T. Vaidya, was obtained for the disposal of bodies of pauper-patients when private charity could not be found for the purpose.

8. Of the cases admitted into the Hospital, information in regard to their being previously inoculated was obtained in 6 cases. The particulars regarding their sex, age, and the dates of their inoculation, &c., are as follows :—

Date of discharge (recovery)	Date of death.	Names.	Sex.	Age.	Date of inoculation.	Date of admissions.
2-12-99	...	Gopal Raju ...	Male.	35	17-8-99	14-11-99
...	30-1-00	Krishnabai Atmaram ...	Female.	7	21-1-00	30-1-00
8-3-00	...	Gajrabai Atmaram ...	"	15	21-1-00	30-1-00
5-3-00	...	Nagu Raghu ...	Male.	28	21-12-99	9-2-00
...	30-3-00	Pandu Mukanda ...	"	40	1-1-00	28-3-00
29-4-00	...	Bahiru Piraji ...	"	40	12-3-00	5-4-00

Of the two deaths there was not much time for observation in the case of patient Krishnabai Atmaram, as she died soon after admission. In the case of Pandu Mukanda there was nothing calling for special remarks.

9. Amongst the staff of the Hospital no one suffered from plague or any other serious malady. Of the persons living on the premises of the Hospital, the daughter of a bhangi, aged about 10 years, was attacked with plague. She was sent to the Arthur Road Hospital, as bhangis are not allowed to be admitted in the Hindu Fever Hospital. How she got the infection was not satisfactorily ascertained; but as she went to beg in the streets it is presumed that she caught infection somewhere else. She was discharged cured.

TABLE I.

10. Total admissions during the year.

Months.	Plague.	Relapsing Fever.	Observation cases including all general diseases.	Total.
June ...	...	...	...	...
July ...	4	...	1	5
August ...	6	...	2	8
September	4	...	3	7
October	6	1	2	9
November	5	...	3	8
December	18	...	...	18
January	27	...	11	38
February	79	...	6	85
March ...	130	...	9	139
April ...	83	2	20	105
May ...	26	7	11	44

11. The largest number of admissions was 38 in the second week of March, 1900. The largest number of daily admission was 11 on the 4th March, 1900.

12. The total number of deaths during the year was 353, of which 326 were from plague.

The percentage of mortality was 75·75 to the total admissions 466.

The largest number of deaths on a day was 8 on the 22nd February and 5th March, 1900.

The largest number of total weekly deaths was 34 in the second week of March, 1900.

TABLE II.

	Admissions.	Deaths.	Recoveries.	Percentage of mortality.
Plague	388	326	62	84·02
Relapsing Fever ...	10	1	9	10·
Observation and other diseases ...	68	26	42	38·23
Total ...	466	353	113	75·75

TABLE III A (PLAGUE).

Months.	To ta- Adm i s sions.	Died with- in 24 hours.	Died with- in 48 hours.	Total Deaths.	Total Recoveries.	Percentage of deaths (not count- ing those who died within 48 hours).
June...	...	...	...	...	...	...
July ...	4	...	...	3	1	75·
August ...	6	3	...	5	1	68·6
September ...	4	2	...	3	1	50·
October ...	6	1	1	4	2	50·
November ...	5	3	...	5	...	100·
December ...	18	4	3	13	5	54·54
January ...	27	15	10	26	1	50·
February ...	79	16	18	59	20	55·5
March ...	130	42	39	114	16	67·3
April...	83	25	23	73	10	71·4
May ...	26	15	2	21	5	44·4

TABLE III B.

Relapsing Fever, Observation and other Diseases.

Months.	Diseases.	Total Admissions	Deaths.	Recoveries.	Percentage of mortality (not counting those who died within 48 hours).
June ...	Relapsing Fever...	...	...	...	...
	Other diseases ...	...	...	...	...
July ...	Relapsing Fever..	...	...	...	...
	Other diseases ...	1	...	1	...
August ...	Relapsing Fever..	...	...	...	...
	Other diseases ...	2	...	2	...
September...	Relapsing Fever..	...	...	...	...
	Other diseases ...	3	1	2	33·33
October ...	Relapsing Fever..	1	...	1	...
	Other diseases ...	2	...	2	...
November...	Relapsing Fever..	...	...	...	...
	Other diseases ...	3	...	3	...
December ...	Relapsing Fever..	...	...	...	...
	Other diseases ...	...	...	...	...
January ...	Relapsing Fever...	...	...	...	...
	Other diseases ...	11	9	2	81·81
February ...	Relapsing Fever...	...	...	...	...
	Other diseases ...	6	4	2	66·66
March ...	Relapsing Fever...	...	...	...	...
	Other diseases ..	9	5	4	55·55
April ...	Relapsing Fever.	2	...	2	...
	Other diseases ...	20	6	14	30
May ...	Relapsing Fever..	7	1	6	14·28
	Other diseases ...	11	1	10	9·09

TABLE IV.

—	Diseases.	Total Admissions.	Deaths.	Recoveries.	Percentage of mortality.
Males ...	Plague ...	253	220	33	86·95
	Relapsing Fever.	7	...	7	...
	Other diseases ...	44	18	26	40·90
Females ...	Plague ...	90	72	18	80
	Relapsing Fever	3	1	2	33·33
	Other diseases ...	15	5	10	33·33
Children ...	Plague ...	45	34	11	75·55
	Relapsing Fever	...	...	...	...
	Other diseases ...	9	3	6	33·33

TABLE V.

Table showing the mortality for the year amongst sexes and Children.

	Total mortality for the year.	Mortality amongst Men.	Mortality amongst Women.	Mortality amongst Child- ren (all under 12 years of age).
Plague	326	220	72	34
Relapsing Fever	1	...	1	...
Observation and other diseases.	26	18	5	3

TABLE V A.

Percentage of Mortality amongst the following Ages.

	Diseases.	Admissions.	Deaths.	Percentage.
1. Up to 1 year ... {	Plague ... ..	...	...	...
	Relapsing Fever...	...	...	...
	Other diseases ...	1	1	100
2. 1 year to 10 ... {	Plague	32	26	81·25
	Relapsing Fever...	...	...	...
	Other diseases ...	3	...	...
3. 10 years to 20 ... {	Plague	108	88	81·48
	Relapsing Fever...	3	1	33·33
	Other diseases ...	17	4	23·52
4. 20 years to 30 ... {	Plague	138	118	85·55
	Relapsing Fever...	2	...	...
	Other diseases ...	27	13	49·19
5. 30 years to 40 ... {	Plague	68	58	85·29
	Relapsing Fever...	4	...	...
	Other diseases ...	14	4	28·57
6. 40 years and upwards. {	Plague	42	36	85·71
	Relapsing Fever...	1	...	...
	Other diseases ...	6	4	66·66

TABLE VI.

Table showing the situation of Buboes.

Situation.	Total number of cases.	Males.	Females.	Mortality.	Recoveries.	Percentage of mortality.
Cervical	12	8	4	10	2	83·33
Parotid	2	1	1	1	1	50·
Right axillary	33	20	13	28	5	84·85
Left axillary	42	27	15	33	9	78·54
Right femoral	59	41	18	49	10	83·05
Left femoral	68	50	18	63	5	92·64
Right inguinal	46	31	15	35	11	76·08
Left inguinal	46	30	16	38	8	82·60
*Other situation	6	4	2	2	4	33·33
No buboes... ..	21	7	14	20	1	95·23
Multiple (buboes)	25	16	9	21	4	84·

* Poplital, Brachial and Pectoral.

TABLE VII.

Table showing Pneumonic Plague (without Buboes).

—				Admitted.	Died.	Recovered.	Percentage of mortality.
Males...	...	...	...	23	20	3	86.95
Females	...	...	...	5	2	3	40
Children	...	...	...	...	...	...	...

TABLE VIII.

Table showing cases of Secondary Plague Pneumonia (complicated with Buboes).

—				Admitted.	Died.	Recovered.	Percentage of mortality.
Males ...	...	...	...	9	7	2	77.77
Females	...	...	...	5	3	2	60.
Children	...	...	...	2	...	2	...

The cases were diagnosed by the appearance of the signs and symptoms of pneumonia developing on the fourth or fifth day of the disease. No bacteriological examination was made.

Symptoms, Character and Treatment.—These have been fully described in the previous Report. No special change worth noting was seen in the symptoms and course of the disease. It may be noted, however, that pneumonic type was more prevalent this year than before. The rate of mortality in the Hospital was rather high, as the epidemic of the year under report was more virulent in type than the last, and, secondly, the majority of the patients that came to the Hospital did so only at a late stage of the disease. They had generally tried concealment and came only when actually detected or when concealment became impossible.

Notwithstanding the notifications and circulars enjoining relaxation of the plague measures regarding the detection of plague cases, their removal to the hospital, disinfection and segregation of contacts, etc., the working of the measures as carried on till now had not had the effect of removing the fright and terror which have prevailed amongst the people from the beginning.

This general unnerving of the mind naturally became intensified when there was an actual attack of plague or even of some other febrile affection. It upset the mental balance of the patient and made him very restless and anxious, which condition, I believe, contributes a great deal to intensify the severity of the disease and causes a higher mortality among the natives in general and the lower and ignorant classes in particular, and it is the poor who constitute the majority of our patients.

I believe that in this is to be found the explanation of the fact that the ratio of recoveries is much higher amongst Europeans and the upper and the more well informed classes of the natives. The latter have not much dread of plague measures and it is they who alone practically receive the benefit of the relaxation of plague measures given from time to time.

The poor, that is the more unnerved portion of the population, are not able to take advantage of the relaxation and thus they fall victims in greater proportion.

It is highly desirable, therefore, that attempts should be made to remove this fright as much as possible.

The Plague Commission has rightly appreciated the importance of this element of fright in the treatment of plague cases, and it is to be hoped that in giving effect to their recommendation special attention shall be bestowed upon giving such concessions as will reassure the minds of our poor and more ignorant population.

Fever, Buboes and Period of Convalescence.—All the points under these headings have been fully described in the last year's Report.

Complications.—The chief were congestion of the brain, suppression of urine, diarrhoea, hæmorrhage from the lungs, and in one case from intestines.

Another disease that was found associated with plague was small-pox. Two cases of plague were admitted in the Hospital, and both of them had had an attack of small-pox about a month previous to their getting plague. This fact shows that an attack of small-pox does not give protection against plague.

Mumps, mistaken for plague, has not been observed in the Hospital.

Observation Cases.—The total number of cases was 68, and the diseases which they developed were as follows :—

Syphilitic Buboes	...	...	...	2
Synovitis	...	...	...	1
Cholera	...	...	...	1
Jaundice	...	...	...	1
Capillary Bronchitis	...	...	...	1
Remittent and Intermittent Fevers...			...	62
				<hr/> 68

The line of treatment was nearly the same as described in detail in the previous Report. Bearing in mind the insidious way in which the plague bacilli get access to the body, the rapidity with which they multiply and produce poisonous products (toxins) in the system, the suddenness with which the plague manifests itself, the rapid course it undergoes, and the degenerative changes that are soon produced in the blood and tissues of the body, it stands to reason that the remedial treatment should be commenced as early as possible. The earlier the treatment is adopted, the greater are the chances of recovery.

In Hospital it is rare to get patients whose disease is in its premonitory stage or has just commenced. The condition of the blood and the tissues of the body in the initial stage is quite likely to be changed for the worse in a disease like plague in the course of even 24 to 40 hours, so even the best treatment we know of can be expected to give good results only if the treatment begins immediately after the re-appearance of the first symptoms of the disease. Hospitals have not and are not likely to become so popular as to induce people to resort to them of their own accord. At present they resort to them as a matter of compulsion. If measures are modified in a way to give facilities to people to have recourse to treatment as early as possible, I am sure that the ratio of mortality would be appreciably less than what it is at present.

The germicide that was tried this year was the Per Iodate as recommended by Weaver, in addition to Iodin Terchloride and Liq. Hydrarg. Perchloride. The Iodin Terchloride was not well borne by some, as it produced, though temporarily, a peculiar irritating sensation in the throat and caused vomiting.

The Per Iodate powder was not at all unpleasant to take and was easily taken by the patients without producing nausea or vomiting. It had a very beneficial effect on delirium and fever in plague cases. Delirium was found to subside within a day or two after the Per Iodate was given. It also reduced the temperature in the majority of cases. This was well seen in relapsing fever and other febrile diseases. It had no injurious or debilitating effect on the heart, and it may be given in 10 to 30 gr. doses repeated every third or fourth hour according to the necessity in each case; when it was tried in the early stage of the disease it showed encouraging results.

I must express my thanks to Prof. T. K. Gujjar for preparing the Per Iodate powder at his laboratory and supplying it to this Hospital free of cost.

In addition to the germicides the stimulatory line of treatment was followed in each case. The stimulants used were Amon carbonas, Ether, Digitalis, Strophanthus, Nux Vomica and Alcohol in the form of Rum or Spt. Vini Gallici.

From what has been observed regarding the symptoms, course and the effect of treatment in plague cases, I am of opinion that unless the poison generated in the blood is neutralised by some means, treatment conducted on other lines is not likely to be very much effective and show good results.

In conclusion, it gives me great pleasure to observe that Dr. E. L. Hunt, Captain Stuart, District Plague Officer of this Ward, and Colonel Wilkins, I. M. S., Special Medical Officer, Plague Operations, took a keen interest in the working of this Hospital and were kind enough to visit and offer the necessary suggestions to make the patients comfortable and happy.

BOMBAY, }
26th August, 1900. }

G. B. KHER, L.M. & S.,
Honorary Chief Medical Officer.

No. 28.

The History of the foundation of the Maratha Ward in the Hindu Fever Hospital is as follows :

Some representatives of the backward Hindu classes residing in C and D wards of the city represented to the Municipal Commissioner that it was very inconvenient for them to take their patients to such a long distance as the Maratha Hospital near the Victoria Gardens; and that though the Hindu Fever Hospital occupied a central position in this part of the city, and admitted patients of all castes except Bhangis, Mahars and Dheds, it could not afford to accommodate an unlimited number of patients owing to their not having sufficient funds for the purpose. They therefore requested that some provision should be made for patients of the backward Hindu classes living in this locality.

The Municipal Commissioner directed plans and estimates to be prepared for a small hospital for these people in the Churni Road Gardens; but before proceeding further, he was good enough to see one of the Honorary Secretaries of the Hindu Fever Hospital, and it was arranged that the Hindu Hospital should provide accommodation for such patients, and that the Municipality would undertake the cost of maintenance, establishment, treatment, feeding, &c. Accordingly two semi-permanent sheds were erected, one by Sett Damodar Gordhandas Sukhadwalla and one by Rao Bahadur Narayan T. Vaidya, and were added to the hospital to accommodate patients of these classes. The Maratha ward of the Hindu Fever Hospital became ready and commenced its working from the 1st March 1900.

As the number of patients went on increasing, the original staff of the hospital was increased and additional Ward-boys, Ayahs and Bhangis were employed to work in the new ward.

The most valuable addition to the staff was that of the English Nurse.

I am glad to say that the nurse Miss Awkett, worked very hard and discharged her duties cheerfully and conscientiously and to the entire satisfaction of all concerned.

As regards supervision and chief direction of the treatment there was of course no distinction between the Maratha ward and the other wards of the hospital.

The Resident Medical Officer did his duty equally by all, and I also did this extra work in the capacity of the Honorary Chief Medical Officer which office I have held for the last $3\frac{1}{2}$ years; and my general remarks are applicable indiscriminately to all the patients under treatment at the hospital.

Staff.

Honorary Chief Medical Officer	...	...	...	...	1
Resident Medical Officer	...	...	...	...	1
English Nurse...	...	...	...	...	1
Hospital Assistant	...	...	...	...	1
Compounder	...	...	...	...	1
Store-keeper	...	...	...	...	1
Ward-boys	...	...	...	...	5
Ayahs	...	...	...	...	2
Cook	...	...	...	...	1
General Servant	...	...	...	...	1
Bhangis	...	...	...	...	3

Of the cases admitted into the hospital information in regard to their being previously inoculated was obtained in two cases. The particulars regarding their sex, age and the dates of their inoculation, &c., are as follows :—

Date of Discharge.	Date of Death.	Names.	Sex.	Age.	Date of inoculation.	Date of Admission.
...	30-3-00	Pandu Mukanda.	Male.	40	1-1-00	28-3-00
29-4-00	...	Bahiru Piraji.	do.	40	12-3-00	5-4-00

TABLE I.

Total admissions during the three months.

Months.	Plague.	Relapsing Fever.	Observation cases including all general diseases.	Total.
March	96	...	9	105
April... ..	70	...	18	88
May	25	4	10	39

The largest number of admissions was 38 in the second week of March 1900.

The largest number of daily admissions was 11 on the 4th March 1900.

The total number of deaths during the three months was 178 of which 167 were from Plague.

The percentage of mortality was 76·72 to the total admissions 232.

The largest number of deaths on a day was 8 on the 5th March 1900.

The largest number of total weekly deaths was 34 in the 2nd week of March 1900.

TABLE II.

	Admissions.	Deaths.	Recoveries.	Percentage of Mortality.
Plague	191	167	24	87·43
Relapsing Fever	4	Nil.	4	Nil.
Observation and other diseases.	37	11	26	29·72
Total ...	232	178	54	76·72

TABLE III-(A) *Plague.*

Months.	Total admissions	Died with- in 24 hours	Died with- in 48 hours	Total deaths.	Total recoveries.	Percentage of Mortality (not counting those who died within 48 hours.)
March	96	36	24	84	12	66·66
April	70	23	15	60	10	68·75
May	25	12	4	23	2	77·77

TABLE III—(B.)

Relapsing Fever, observation and other diseases.

Months.	Diseases.	Total Admissions.	Deaths.	Recoveries.	Percentage of Mortality (not counting those who died within 48 hrs.)
March {	Relapsing Fever. Other diseases.	... 9	... 6	... 3	... 66·65
April {	Relapsing Fever. Other diseases.	... 18	... 5	... 13	... 27·77
May {	Relapsing Fever. Other diseases.	4 10	... ...	4 10	......

TABLE IV.

—			Diseases.	Total Admissions.	Deaths.	Recoveries.	Percentage of Mortality.
Males	...	...	Plague ...	119	105	14	88.23
			Relapsing Fever.	2	...	2	...
			Other diseases ...	24	5	19	20.83
Females	...	...	Plague ...	48	41	7	85.41
			Relapsing Fever.	2	...	2	...
			Other diseases ...	10	5	5	50
Children	...	...	Plague ...	24	21	3	87.1
			Relapsing Fever.	...	...	...	...
			Other diseases ...	3	1	2	33.33

TABLE V.

Table shewing Mortality for the year amongst sexes and Children.

—				Total mortality for the year.	Mortality amongst men.	Mortality amongst women.	Mortality amongst children (all under 12 years of age.)
Plague	...	...	...	167	105	41	21
Relapsing fever	...	...	...	.....	.....	.....	.....
Observation and other diseases				11	5	5	1

TABLE V (A).

Percentage of Mortality amongst the following ages :—

—			Diseases.	Admissions.	Deaths.	Percentage.
1.—Up to 1 year	...	{	Plague ...	.....	.....	.....
			Relapsing	.....	.....	.....
			Other diseases ...	.....	.....	.....
2.—1 year to 10	...	{	Plague ...	10	8	80
			Relapsing	.....	.....	.....
			Other diseases ...	4	2	50
3.—10 years to 20	...	{	Plague ...	56	48	85
			Relapsing	1	.....	.....
			Other diseases ...	7	1	14.28
4.—20 years to 30	...	{	Plague ...	72	67	93.05
			Relapsing	3	.....	.....
			Other diseases ...	12	5	41.66
5.—30 years to 40	...	{	Plague ...	23	18	18.26
			Relapsing	.....	.....	.....
			Other diseases ...	6	.....	.....
6.—40 years and upwards	{	{	Plague ...	30	26	86.66
			Relapsing	.....	.....	.....
			Other diseases ...	8	3	37.5

TABLE VI.

Table showing the situation of Buboes.

Situation.	Total number of cases.	Males.	Females.	Mortality.	Recoveries.	Percentage of Mortality.
Cervical	1	.....	1	1	.....	100
Parotid	2	1	1	1	1	50
Right Axillary	15	9	6	14	1	93·33
Left Axillary	21	14	7	17	4	80·95
Right Femoral	32	21	11	29	3	90·62
Left Femoral	40	30	10	37	3	92·5
Right Inguinal	27	19	8	24	3	88·88
Left Inguinal	20	13	7	16	4	80
*Other situations	2	1	1	1	1	50
No Buboes	10	6	4	8	2	80
Multiple Buboes	8	5	3	8	.....	100

* Popliteal and Brachial.

TABLE VII.

Table showing Pneumonic Plague (without Buboes).

—	Admitted.	Died.	Recovered.	Percentage of Mortality.
Males	11	9	2	81·81
Females	2	2	.....	100
Children ... ..	.....	.....	.....	.....

TABLE VIII.

Table showing Cases of secondary Plague Pneumonia (complicated with Buboes).

—	Admitted.	Died.	Recovered.	Percentage of Mortality.
Males	4	3	1	75
Females	3	3	.....	100
Children	2	.....	2	.....

G. B. KHER, L. M. & S.,

BOMBAY, 26th August 1900.

Honorary Chief Medical Officer.

Forwarded with compliments, to the Special Medical Officer, Plague Operations, Bombay. It is regretted that there was much delay in the submission of this report.

The undersigned cannot allow this opportunity to pass without sincerely thanking the Municipal Commissioner and the Special Medical Officer for opening these wards. It will be observed that they were freely availed of by the backward classes of Hindus, there being 232 admissions in a short period of three months.

Dr. G. B. Kher, L. M. & S., as Honorary Chief Medical Officer of the Hindu Fever Hospital, was in charge of these wards also. He was indefatigable in his attendance and treatment of patients and has well earned the thanks of all Hindus, more especially so as his was a labour of love and not for money.

The House Surgeon, Mr. Divatia, devoted his whole time to his work and was very attentive to the treatment and comfort of patients.

Miss Aukett, the English nurse, by her genial disposition and motherly care endeared herself to the patients in the hospital, and showed how much good and systematic nursing contributes to the recovery of the patients, for on her taking charge of her duties in the hospital, the proportion of recoveries very much improved.

NARAYAN TRIMBAK VAIDYA,

Honorary Secretary, H. F. Hospital,

(In charge Maratha Ward).

No. 29.

Report of the Telugu Fever Hospital from 1st June 1899 to 31st May 1900.

This Hospital was founded in April 1897, and was not closed with the decrease of the epidemic last year. The Committee which was formed of the following gentlemen rendered valuable assistance to the hospital and they subscribed the sum as described against their names :—

	Rs.	
Rao Bahadur Ellapa Balaram, J. P. (Chairman)	125	per month
Sayaji Nagooji, Esq.	75	„
Rao Saheb Manaji Ragooji	50	„
Rajuna Luxmon Jilkar, Esq., and Maloo Luxmon Jilkar, Esq. (Hon. Secretary)	50	„
Gungaram Sayboo, Esq.	50	„
Narsoo Sayboo, Esq., J. P.	25	„

Rao Bahadur Ellapa Balaram, J. P., the Chairman of the Committee, has rendered commendable assistance to the hospital not only by subscribing a very good sum every month, but by his close attention to, and very commendable management of, the Hospital. He visited the Hospital every day early in the morning, looked to the convenience of the patients and tried to alleviate their sufferings as far as possible.

The hospital staff is as follows :—

Medical Officer	Dr. G. B. Kher (Honorary).
Resident Medical Officer	H. A. Girdharlal D. Vyasa.
Compounders	2
Ward-boys	3
Ayah	1
Dhobi	1
Sweepers... ..	2 supplied by Municipality.
Ramoshees	2 do. do.

The Medical Officer, Dr. Khor, worked from January to April 1900. He was succeeded by H. A. Girdharlal D. Vyas, who was in March last appointed as Resident Medical Officer and has been working as such till now. Two compounders were engaged from January to April 1900, after which time one was discharged on account of the abatement of plague. The other compounder was discharged by the Committee at the instance of Dr. E. L. Hunt in May last, after which time H. A. Girdharlal D. Vyas discharged the duties of the compounder in addition to his own.

The hospital is situated in a thickly populated locality—Kamatipura; it consists of a one storied building built of stone. It was formerly used as a Dharamsala for the Telangus whose marriages were celebrated there. It is 46 feet by 35 feet. It has 8 plague wards, 1 observation ward, 4 convalescent wards, 1 contact shed, 1 cook-room and store-room, and 1 dead-room outside the hospital. Four of the 8 plague wards are on the ground floor and the other four are on the 1st floor. Patients in dangerous state of health were kept in the wards on the ground floor. The upper floor has also a verandah on which arrangements for the dispensary were made.

Two beds are generally placed in a ward.

To the east of the hospital are a contact shed and 4 convalescent wards erected on the municipal ground. The contact shed was used only for the goods and chattels of the contacts who were taken to the Balaram Camp. Close by the hospital there is a Government Girls' School in which accommodation was found for the Resident Medical Officer.

Behind the girls' school there are two latrines which are cleaned by the sweepers. Each has one seat. The sewage and waste water are carried away by the underground drain. Phenyle water is used for cleaning the latrines.

The clothes of the patients are saturated in carbolic lotion before they are sent with the bhungis to the steam disinfecting station at Northbrook Gardens. After the clothes are received from the disinfecting station they are given to dhobies for washing.

The water-supply is derived from the pipe which supplies the city of Bombay.

The hospital wards and the building are disinfected twice a day with a solution of phenyle after which they are linewashed. The clothes were sent to the disinfecting station many a time and were kept for about an hour or an hour and a half each time.

The funeral of pauper patients was performed by the Committee who defrayed the necessary charges.

The staff of the hospital did not suffer from any illness.

TABLE I.—*Total Admissions during the year.*

Months.			Plague.	Relapsing Fever.	Observation cases, including all general diseases.	Total.
June	1899	...	3	.....	.....	3
July	"	...	6	.....	.....	6
August	"	...	12	.....	3	15
September	"	...	16	.....	.....	16
October	"	...	3	.....	1	4
November	"	...	2	.....	.....	2
December	"	...	15	1	2	18
January	1900	...	16	1	.....	17
February	"	...	35	1	3	39
March	"	...	40	.....	7	47
April	"	...	42	.....	6	48
May	"	...	12	.....	1	13

Largest number of admissions during the week 10th March to 17th March 1900 was 17.

Largest number of admissions was on the following days :—

28th February 1900	...	...	...	5
11th March 1900	...	...	...	6

Total number of deaths during the year.	Total number of deaths from Plague.	Percentage of deaths to admissions.
174	158	76·31

Largest number of deaths took place on the following days;—19th December 1899, and 14th April 1900, and 26th April 1900.

TABLE II.

—	Admissions.	Deaths.	Recoveries.	Percentage of mortality.
Plague	202	154	48	76·2
Relapsing Fever	2	2	...	100
Observation and other diseases.	24	18	6	33·3
Total...	228	174	54	.....

TABLE III.

Months.	Total admissions.	Died within 24 hours.	Died within 48 hours.	Total Deaths.	Total Recoveries.	Percentage of Deaths.
June 1899	3	.....	2	2	1	66·6
July „	6	1	4	5	1	83·3
August „	15	5	6	11	4	73·3
September „	16	7	7	14	2	87·5
October „	4	.....	2	2	2	50
November „	2	1	1	2	...	100
December „	16	6	6	12	4	75·
January 1900	17	6	7	13	4	76·4
February „	39	5	23	28	11	71·7
March „	47	10	24	34	13	82·9
April „	48	13	28	41	7	85·4
May „	15	2	8	10	5	66·6

TABLE IV.

—	Total admissions.	Deaths.	Recoveries.	Percentage of Deaths.
Males	111	93	18	83·78
Females	72	52	20	72·08
Children	45	29	16	62·22

TABLE V.—*Table showing the Mortality for the Year among Sexes and Children.*

Total mortality for the year.	Mortality amongst men.	Mortality amongst women.	Mortality amongst Children under 12 years.
174	93	52	29

TABLE VI.—*Showing the Situation of Buboes.*

Situation.	Total No. of cases.	Males.	Females.	Mortality.	Recoveries.	Percentage of Mortality.
Cervical	2	1	1	2	...	100
Parotid	5	2	3	3	2	60
Right axillary	17	8	9	14	3	82·35
Left axillary	21	11	10	21	0	100
Right femoral	28	18	10	19	9	67·85
Left femoral	30	22	8	24	6	80
Right inguinal	31	21	10	23	8	74·19
Left inguinal	32	20	12	25	7	78·12
Other situations	2	1	1	1	1	50
No buboes	28	15	13	18	10	64·28
Multiple buboes	6	2	4	4	2	66·66

TABLE VII.

Nil.

TABLE VIII.

Nil.

No routine line of treatment was adopted and every case was treated according to the symptoms present.

Patients in a collapsed condition were treated with stimulants, *viz.*, æther digitalis, strychnine, brandy, ammonia, and strophanthus, some hypodermically and sometimes by the mouth. Nutritive enemata were given.

Buboes were generally femoral and axillary, and appeared on the 2nd, 3rd, and 4th day of the outset. Very few glands subsided, most suppurated between 8 and 12 days.

Convalescence lasts from 4 to 6 weeks.

In conclusion allow me to say that it will be improper and unjustifiable to forget the pains and interest taken and assistance rendered by Lieut. French and Capt. Chichester, District Officers, in the promotion of the hospital affairs, and for their kindness towards the Committee Members and the hospital staff who worked very satisfactorily.

GIRDHARLAL D. VYAS,
Resident Medical Officer,
Telungu Fever Hospital.

S. S. Colaba Plague Hospital.*Opened 20th December 1899 (closed 30th April 1900).*

With reference to the S. S. Colaba Plague Hospital, has the honour to report that the charts of the cases have been counted and carefully scrutinised. The following data is considered accurate :—

Admissions	...	...	240	died	...	...	...	139	recovered	...	...	101
Plague	...	...	203	„	...	...	...	136	„	..	...	67
Observation	...	...	37	„	...	...	...	3	„	...	...	34

2. Medicines, hospital clothing and furniture were supplied by the Municipal authorities.

3. The payment of staff and servants, the payment of all foods and clothing for discharged patients, were paid out of charity funds collected for this purpose.

4. The hospital was completely built and paid for out of charity funds.

5. The information given in this office No. 3173, dated 19th September 1900, was given to this office during June of this year. His figures, 276 admissions and 186 deaths, do not appear correct, but tally with the figures of the year 1898-1899.

6. The above figures in para. 1 have been taken from the charts of the patients, and unless some are missing are absolutely correct, as they are all brought up to date and signed. It is regretted by the Committee that the register is not available, but the doctor has left Bombay and the Secretary has gone to Simla. The records were sent to the latter by the Acting Secretary nearly two months ago, but no reply has been received.

R. LOCH, Capt.,

District Officer, A Ward.

THE EXPERIMENTS

WITH

LUSTIG'S SERUM

During the year under Report.

The experiments with Lustig's Serum during the year under report.

In continuation of my Report last year on Lustig's Serum, it will be seen that I had determined to carry on the alternative system with this serum. Nearly 500 cases have been treated on either side now, and the results fully justify the favourable opinion formed concerning the value of this method of treatment compared with any other form at present known. I think we may infer that the experimental stage is past.

The experiments on the alternative method of treatment were began in May 1899, and the reports from the Arthur Road Hospital for each month are given as follows :—

No. 614 OF 8TH JUNE 1899. ,

To

THE MUNICIPAL COMMISSIONER.

SIR,—I have the honour to forward herewith a report and return of the cases treated with Professor Lustig's Serum in May 1899.

2. The total number of cases treated was 17, of whom 9 died and 8 recovered, giving a mortality rate of 52·94 per cent., as against 69·23 per cent. amongst those not similarly treated. The results show a difference of 16·29 per cent. in favour of the cases treated with the serum.

3. The cases were divided in the following series :—

Series.	Horse No.	Bleeding.	No.	Died.	Recovered.
XI*	1	Second	15	8	7
XII†	4		2	1	1
			17	9	8

I have, &c.,

N. H. CHOKSY,

Medical Officer in charge, Arthur Road Hospital.

CONSIDERED—Letter from the Commissioner, No. P.—4560, dated the 22nd July 1899—Forwarding, for the information of the Corporation, the following statement of plague cases treated with Professor Lustig's serum by Khan Bahadur Dr. N. H. Choksy, at the Arthur Road Hospital during the month of June 1899.

Four cases were treated with the serum, out of these 3 died and 1 recovered, 13 cases were not so treated, and out of these 11 died and 2 recovered.

No. 837 OF 1899.

ARTHUR ROAD HOSPITAL,
BOMBAY, August 1899.

FROM THE MEDICAL OFFICER,

IN CHARGE, ARTHUR ROAD HOSPITAL,

TO THE MUNICIPAL COMMISSIONER.

SIR,—I have the honour to submit the following report on cases of plague treated with Professor Lustig's serum at the Arthur Road Hospital during July 1899 :—

1. There were 48 admissions during the month, but as in 6 of these, the diagnosis could not be determined during life, observations were made on 42 patients only. Twenty-one cases were treated with the serum, and 21 by ordinary methods. The patients were taken alternately in the order of admission.

2. The cases treated with the serum were divided into 2 sets : the first comprised 6 cases, and the second 15. The serum used in the former was from the second bleeding of horse No. 4, whereas that used in the latter, was a portion of that prepared by Dr. Galleotti in February last for the Indian Plague Commission, and which had been left unutilized. It was found to have become considerably deteriorated and the results given by it have not been so satisfactory as by the former.

3. In the first set of 6 cases treated with the serum, 2 died and 4 recovered whereas amongst those not so treated, there were 5 deaths and 1 recovery only.

In the second set of 15 cases the serum cases had 11 deaths and 4 recoveries, as against 9 deaths and 6 recoveries in the non-serum cases. Besides the fact that the serum used was old and deteriorated, the non-serum cases had the advantage of 2 patients that had Haffkine prophylactic inoculation less than 5 months ago, and both of them recovered, as against one such case only amongst the serum cases. On the other hand there were amongst the latter three imported cases from Poona, of a malignant type, all of whom died.

4. The observation may be summarised as follows :—

Serum Cases—Horse No. 4.		No.	Died.	Recovered.
(2nd bleeding) ...	...	6	2	4
Old Serum ...	...	15	11	4
		—	—	—
		21	13	8
		No.	Died.	Recovered.
Non-serum Cases...	...	21	14	7

I have, &c.,

N. H. CHOKSY,

Medical Officer in charge, Arthur Road Hospital.

No. 942 OF 19TH SEPTEMBER 1899.

TO THE MUNICIPAL COMMISSIONER.

SIR,—I have the honour to submit the following report on cases of plague treated with Professor Lustig's serum, at the Arthur Road Hospital, during August 1899.

1. As there were only 30 admissions from plague, 15 cases were treated with the serum, and 15 by ordinary methods, every alternate case having been injected with the serum.

2. The serum cases were divided into three series; these comprised 1, 6 and 8 cases, respectively, in each. In the former two the old serum referred to in the report for July, was used; in the last, fresh serum, prepared from the 3rd bleeding of horse No. 5, was used. The results were as follows :—

						No.	Died.	Recovered.
Series XIII	{ Old serum, Horse No. 5 }	...	...	1	1	...	
Series XIV		{ (3rd bleeding.) }	...	6	5	1		
Series XV		...	...	...	8	6	2
Total				...	15	12	3	

3. Of the 15 cases not treated with the serum, 9 died and 6 recovered. Two of the recoveries were in cases that were rather doubtful; and, although they were

included as plague from some clinical features, no confirmatory evidence could be obtained as to their nature.

4. Among the serum cases there were 7 moribund patients (including one of pneumonic plague), and all of whom died as against only two such, which also ended fatally, in those not so treated. Thus it appears that even in a small series of 15 cases, the results have become considerably vitiated by the inclusion of 5 moribund cases in those treated with the serum.

I have, &c.,

N. H. CHOKSY,

Medical Officer in charge, Arthur Road Hospital.

No. 1046 OF 17TH OCTOBER 1899.

To

THE MUNICIPAL COMMISSIONER

for the City of Bombay.

SIR,—I have the honour to submit the following report on cases of plague treated with Professor Lustig's serum, at the Arthur Road Hospital during September 1899:—

1. The total admissions during the month numbered 38 ; 17 cases were treated with the serum and 17 by ordinary methods. Every alternate case being taken for serum. Of the rest, 1 case died before he could be seen by the Medical Officer, and the three cases belonged to that peculiar type of plague which is characterised by the absence of apparent buboes, or any affections of the internal organs, and in which diagnosis is not possible unless the patient dies or recovers. Bacteriological examination and cultures have repeatedly failed to reveal the nature of the cases, and it is only by the temperature of the curves, which are typical of plague, and other symptoms that the cases are ultimately recognised as such. Two of these cases died, and one recovered under ordinary treatment.

2. The serum cases were divided into 2 series ; in the first series 8 cases were treated and of these 5 died and 3 recovered ; in the second series there were 9 cases and of these 4 died and 5 recovered :—

	No.	Died.	Recovered.
Series XV	... 8	5	3
Series XVI	... 9	4	5
	<hr/> 17	<hr/> 9	<hr/> 8

3. Of the 17 cases not treated with the serum, 16 died and 1 recovered.

4. On analysing the nature of the cases, it is seen that, amongst the serum cases, there were 4 moribund and 1 convalescent patients, as against 6 moribund in the non-serum cases ; so that the former had an advantage over the latter of 2 less moribund and 1 convalescent.

5. The results may be summed up as follows :—

	No.	Died.	Recovered.
Serum Cases	... 17	9	8
Non-serum Cases	... 17	16	1

6. The figures of the report for August require correction, as one case amongst those not treated with the serum that was taken as cured died subsequently, so that the revised figure would be :—

	No.	Died.	Recovered.
Serum Cases	... 15	12	3
Non-serum Cases	... 15	10	5

I have, &c.,

N. H. CHOKSY,

Medical Officer in charge, Arthur Road Hospital.

Considered the following :—

No. 9240 OF 1899-1900.

MUNICIPAL COMMISSIONER'S OFFICE,
BOMBAY, 23rd November 1899.

To

THE MUNICIPAL SECRETARY.

SIR,—I have the honour to forward herewith a copy of the report from Khan Bahadur Dr. N. H. Choksy about the cases of plague treated by him at the Arthur Road Hospital during the month of October 1899 with Professor Lustig's serum as prepared in Bombay.

I have, &c.,

W. L. HARVEY,

Municipal Commissioner.

No. 1114 OF 1899.

ARTHUR ROAD HOSPITAL,
BOMBAY, 16th November 1899.

FROM THE MEDICAL OFFICER,

Arthur Road Hospital,

TO THE MUNICIPAL COMMISSIONER

for the City of Bombay.

SIR,—I have the honour to submit the following report on cases of plague treated with Professor Lustig's serum at the Arthur Road Hospital during October 1899.

1. The total admissions during the month numbered 58; of these, 26 cases were treated with the serum and 25 by ordinary methods, every alternate case being injected. Of the rest, there was one doubtful case which recovered, and six others were cases of the same nature as described in the report for last month, *viz.*—

Without apparent buboes or pneumonia, and from these five died and one recovered.

2. The serum cases were divided into two series: in the first, 15 cases were treated and of these 12 died and 3 recovered; in the second, there were 11 cases and of these 9 died and 2 recovered.

	No.	Died.	Recovered.
Series XVI	... 15	12	3
Series XVII	... 11	9	2
	26	21	5

3. Of the 25 cases not treated with the serum, 21 died and 4 recovered.

4. The serum cases included 11 moribund and one convalescent case, as against 8 moribund and 1 convalescent in the non-serum cases.

5. The result may be stated as follows :—

	No.	Died.	Recovered.
Serum Cases ...	26	21	5
Non-serum Cases...	25	21	4

I have, &c.,

N. H. CHOKSY,

Medical Officer in charge, Arthur Road Hospital.

No. 1259 OF 1899.

ARTHUR ROAD, 20th December 1899.

To

THE MUNICIPAL COMMISSIONER

for the City of Bombay.

SIR,—I have the honour to submit the following report on cases of plague treated with Professor Lustig's serum, at the Arthur Road Hospital during November 1899.

There were 31 admissions from plague during the month, and of these 15 were treated with the serum and 16 by ordinary methods. Every alternate case was injected with the serum.

Of the former 10 died and 5 recovered, whereas the non-serum cases had 12 deaths and 4 recoveries.

The serum cases included 7 moribund and 1 convalescent patients, as against 5 moribund and 3 convalescents, in the non-serum.

The result for the month may be stated as follows :—

	No.	Died.	Recovered.
Serum Cases ...	15	10	5
Non-serum Cases ...	16	12	4

As one of the non-serum cases included amongst those recovered in the October report died during the month, the results for that month would stand thus :—

	No.	Died.	Recovered.
Serum Cases ...	26	21	5
Non-serum Cases...	25	22	3

A table giving the particulars of the patients treated in November is herewith attached as usual.

I have, &c.,

N. H. CHOKSY,

Chief Medical Officer in charge, Arthur Road Hospital.

No. 102 OF 1900.

To

THE MUNICIPAL COMMISSIONER

for the City of Bombay.

SIR,—I have the honour to submit the following report on cases of plague treated with Professor Lustig's serum at the Arthur Road Hospital during the month of December 1899.

1. The total number of plague patients admitted during December 1899 was 56. Of these 25 were treated with the serum and 25 by ordinary methods, every alternate case having been injected with the serum. Of the rest 4 patients suffered from plague without buboes or pneumonia and in whom diagnosis could not be verified till after death. One was a case of pneumonic plague that died before the disease could be diagnosed, and there was one doubtful case that recovered.

2. Of the 25 serum treated cases 13 died and 12 recovered, whereas the non-serum cases had 23 deaths and 2 recoveries only.

3. The former included 4 moribund and 1 convalescent cases, as against 6 moribund and 1 convalescent in the latter.

4. The results for the month may be stated as follows ;—

	No.	Died.	Recovered.	Percentage of mortality.
Serum cases ...	25	13	12	52·00
Non-serum cases...	25	23	2	92·00

5. The observations with the alternate system now total 284 cases—142 serum cases, and 142 treated by ordinary methods. Of the former, 93 have died and 49 recovered, whereas the latter shows 112 deaths and 30 recoveries.

	No.	Died.	Recovered.	Percentage of mortality.
Serum cases ...	142	93	49	65·49
Non-serum cases ...	142	112	30	78·87

6. If, however, the 45 moribund cases that died and 6 convalescent that recovered in the serum cases be excluded from comparison, and so also the 39 moribund that died and 11 convalescent that recovered in the non-serum cases, the results would be as follows :—

	No.	Died.	Recovered.	Percentage of mortality.
Serum cases ...	91	43	43	52·74
Non-serum cases ...	92	73	19	79·34

The usual tables showing the details of the cases treated with the serum during December are herewith appended.

I have, &c.,

N. H. CHOKSY,

Medical Officer in charge, Arthur Road Hospital.

No. 348 OF 19TH FEBRUARY 1900.

To

THE MUNICIPAL COMMISSIONER

for the City of Bombay.

SIR,—I have the honour to submit the following report on cases of plague treated with Professor Lustig's serum at the Arthur Road Hospital, during January 1900 :—

The admissions from plague numbered 120 during the month. Every alternate case was treated with the serum, except two cases of pneumonic plague in whom diagnosis could not be verified till after death.

Of the 59 cases treated with the serum, 38 died and 21 recovered, giving a mortality rate of 64·40 per cent.

Of the 59 cases not so treated, 44 died and 15 recovered, giving a mortality rate of 74·57 per cent.

The serum cases included 17 moribund and 6 convalescent cases, and the non-serum 18 moribund and 6 convalescent; the moribunds and convalescents were thus pretty nearly equal in both series.

If these be excluded from comparison, the results show a mortality rate of 58·33 per cent. for the serum cases, as against 74·20 per cent. for the non-serum.

The tables showing the details of the cases treated with the serum have been appended with the report as usual.

I have, &c.,

N. H. CHOKSY,

Medical Officer in charge, Arthur Road Hospital.

No. 526 OF 16TH MARCH 1900.

To

THE MUNICIPAL COMMISSIONER

for the City of Bombay.

SIR,—I have the honour to submit the following report on cases of plague treated with Professor Lustig's serum at the Arthur Road Hospital, during February 1900 :—

1. The total number of admissions from plague was 177 cases—86 of these were treated with the serum alternately with 85 by ordinary method, leaving 6 extra cases only. Of these, one was transferred to another hospital soon after admission, at the request of the patient's friends; 3 were cases of plague without buboes or pneumonia that could not be diagnosed till after death; and 2 died before they could be put under proper treatment.

2. The serum cases were divided into four series, and their results, as well as those of the controls of each series, were as follows :—

Series.	Horse No.	Serum cases.			Control Cases.		
		No.	Died.	Recov- ered.	No.	Died.	Recov- ered.
XXI (completed)	5 (4th bleeding)	5	4	1	5	4	1
XXII „	1 (4th „)	35	25	10	35	33	2
XXIII „	3 (4th „)	25	17	8	25	19	6
XXIV (to be completed)	8 (1st „)	21	17	4	20	12	8
		86	63	23	85	68	17

3. The mortality of serum cases was, therefore, 73·25 per cent. as against 80·00 in those not so treated.

4. The serum cases included 6 convalescent patients, and 26 moribund, whereas the non-serum cases had 5 convalescents and 31 moribund.

5. As one of the non-serum cases that was taken as cured in the report for January, died subsequently, the figures for that month would be as follows :—

	No.	Died.	Recovered.	Per cent of Mortality.
Serum cases	59	38	21	64·40
Non-serum cases	59	45	14	76·27

6. Table showing the details of the serum cases have been appended to the report as usual.

I have, &c.,
N. H. CHOKSY,
Special Assistant Health Officer.

No. 735 OF 17TH APRIL 1900.

To

THE MUNICIPAL COMMISSIONER.

SIR,—I have the honour to submit the following report on cases of plague treated with Professor Lustig's serum at the Arthur Road Hospital during March 1900 :—

1. As the supply of serum became temporarily exhausted, the serum treatment had to be suspended from the 17th ultimo; all the patients admitted thereafter up to the end of the month were upon ordinary treatment. There were 149 admissions during the former period, and of these 74 received the serum treatment, and 75 were treated as usual.

2. The serum cases were divided into 4 series, and their results as well as those of the control cases of each series were as follows :—

Series Horse No.		Serum Cases.			Control Cases.		
		No.	Died.	Recovered.	No.	Died.	Recovered.
XXIV (completed).	8 (1st bleeding)	5	3	2	6	5	1
XXV ...	4 (4th „)	24	13	11	24	18	6
XXVI ...	2 (3rd „)	34	23	11	34	28	6
XXVII (to be completed).	9 (1st „)	1	6	5	11	8	3
Total ...		74	45	29	75	59	16

3. The mortality of serum cases was, therefore, 60·8 per cent. as against 78·66 per cent. in the controls.

4. The serum as well as the control cases had 17 moribunds each; there were 5 convalescents amongst the former as against 7 in the latter.

5. The total observations on the alternate system of treatment now amount to 722 cases. 361 received the serum treatment and an equal number were treated by ordinary methods.

5. Of the 361 serum cases 239 died, and 122 recovered, giving a mortality rate of 66·20 per cent.

7. Of the 361 non-serum cases 284 died and 77 recovered, giving a mortality rate of 78·67 per cent.

8. The difference in the mortality rate in favour of the serum cases appears to be 12·47 per cent.

	No.	Died.	Recovered.	Percentage of Mortality.
Serum Cases	361	239	122	66·20
Non-serum Cases	362	284	77	78·67

9. The serum and the non-serum cases included an equal of moribunds—105, all of whom died: the former had 23 convalescents, whereas the latter had 29 and all these recovered.

10. If all the moribunds and convalescents be eliminated from comparison, there remain the really acute cases that came under treatment in either series and their results are as follows :—

	No.	Died.	Recovered.	Percentage of Mortality.
Serum Cases	233	134	99	57·51
Non-serum Cases	227	179	48	78·85

11. The difference, therefore, in the mortality rate in favour of the serum treatment appears to be 21·34 per cent.

12. If the ratios of recovery rates be calculated on the serum and non-serum cases, including and excluding the moribunds and convalescents, respectively, they stand as follows :—

	Serum Cases.	Non-serum Cases.
All cases	1·58	to 1
Excluding moribunds and convalescents	2·06	to 1

i.e., if 100 patients recover, out of a certain number under ordinary treatment, the same number, if treated with the serum, would give 158 recoveries in the one case, and 206 in the other; or to put it in another way, the chances of recovery by the serum treatment are enhanced by 58 per cent. in one case, and by 106 per cent. in the other.

13. Table showing the details of the cases treated during March have been appended to the report as usual.—I have, &c.,

N. H. CHOKSY,
Special Assistant Health Officer.

No. 894 OF 11TH MAY 1900.

TO THE MUNICIPAL COMMISSIONER

for the City of Bombay.

SIR,—I have the honour to submit the following report on cases of Plague treated with Professor Lustig's serum, at the Arthur Road Hospital during April 1900 :—

1. The serum treatment was resumed during the month and out of 160 admissions from plague, 80 were treated with it and 79 by ordinary methods. In one

case only diagnosis could not be verified during life. Every alternate case was injected with the serum, as usual.

2. The serum cases were divided into five series. The results of these, together with those of the control cases, were as follows:—

Series.	Horse No.	Serum Cases.			Control Cases.		
		No.	Died.	Recover- ed.	No.	Died.	Recover- ed.
XXVII (Completed) ...	9 (1st bleeding)	5	4	1	5	3	2
XXVIII „ ...	5 (5th „)	25	19	6	25	19	6
XXIX „ ...	10 (1st „)	25	17	8	25	23	2
XXX „ ...	7 (2nd „)	11	6	5	11	8	3
XXXI (To be Completed)	1 (5th „)	14	9	5	13	8	5
		80	55	25	79	61	18

3. The mortality amongst serum cases was 68·75 per cent. as against 77·21 in the controls.

4. The serum cases included 3 convalescent patients and 21 moribund, whereas the non-serum cases had 8 and 24, respectively.

5. Tables giving the details of the cases treated with the serum have been appended to the report, as usual.

I have, &c.,
N. H. CHOKSY,
Special Assistant Health Officer.

No. 1143 OF 20TH JUNE 1900.

TO THE MUNICIPAL COMMISSIONER.

SIR,—I have the honour to submit the following report on cases of Plague treated with Professor Lustig's serum, at the Arthur Road Hospital during May 1900:—

1. The total admissions from Plague were 64; of these 31 were treated with the serum alternately with 32 by ordinary methods; and one patient died before he could be seen by the Medical Officers.

2. The serum cases were divided into 3 series and the results of each series, together with those of the control cases, were as follows:—

Series.	Horse No.	Serum Cases.			Control Cases.		
		No.	Died.	Recover- ed.	No.	Died.	Recover- ed.
XXXI (Completed) ...	1 (15th bleeding)	3	2	1	4	4	...
XXXII („) ...	6 (1st „)	19	13	6	19	18	1
XXXIII (To be completed) ...	12 (1st „)	9	6	3	9	7	2
		31	21	10	32	29	3

3. Of the 31 serum cases, 21 died and 10 recovered, whereas of the 32 not so treated, 29 died and only 3 recovered.

4. The serum cases included 2 convalescent and 10 moribund patients against 1 and 12, respectively, in the non-serum.

5. Tables giving the details of the cases treated with the serum have been appended to the report, as usual.

6. The statistics for April require alteration, as six of the serum cases that were taken as cured, died subsequently to the date of the last report, the causes of death and the period they were in hospital were as follows:—

1. Exhaustion 1½ months.
2. Dysentery 2 „
3. Do. 1 month and 21 days.
4. Do. 1 „ „ 10 „
5. General Tuberculosis 1 month.
6. Tabes Mesenterica 1½ months.

All these had practically recovered from Plague, but died from complications above named.

The revised figures for April are therefore as follows:—

	No.	Died.	Recovered.
Serum Cases ...	80	61	19
Non-serum Cases...	79	61	18

I have, &c.,
N. H. CHOKSY,
Special Assistant Health Officer.

Summary of all cases treated during the year in question.

Professor Lustig's Serum.—As the observations on Professor Lustig's Curative Serum which have now extended over nearly two and-a-half years (with some interruptions), have been brought to a close during the period covered by this report, it would not be out of place to give here a brief resumé of the results. Two sets of observations were made extending over varying periods—one by the method of so-called "Selection," in which all the mild, recovering and dying patients were excluded and the other in which every alternate case was treated with the serum irrespective of the condition of the patient.

The former comprised 403 cases treated with serum, and of these 154 recovered, the rate of recovery being 38·2 per cent. During the same period, 1,190 patients were treated by ordinary methods, with 233 recoveries or a recovery rate of 19·5 per cent. The recovery rate in the serum treated cases was therefore double that of the latter. And similarly during the same period, 4,762 patients admitted into the Mahratta and Modikhana Hospitals had a recovery rate of 19·76 per cent., a fact which demonstrates conclusively that the better recovery rate of serum cases was not unduly favoured by the method of treatment adopted, or otherwise the mortality rate in those not so treated would have been preponderatingly high instead of being no more than that of other Hospitals.

The second series of cases on the alternate system comprised 480 cases treated with the serum, and 480 treated alternately by ordinary methods. Of the 480 serum treated cases, 328 died, and 152 recovered, giving a mortality rate of 68·33 per cent. and, therefore, a recovery rate of 31·67 per cent. Of the 480 cases treated by ordinary methods, 382 died, and 98 recovered, giving a mortality rate of 79·58 per cent., and, therefore, a recovery rate of 20·42 per cent.—

	No.	Died.	Recovered.	Percentage of Mortality.	Percentage of Recovery
Serum cases	480	328	152	68·33	31·67
Non-serum cases	480	382	98	79·58	20·42

8 The difference in the recovery rate of serum treated cases is therefore, 11·25 per cent.

But these results are not strictly accurate, inasmuch as they have been rendered fallacious by the inclusion in unequal numbers of moribunds and convalescents in both the series, and hence they do not represent the full value of serum treatment. When the alternate system was begun, attention to this source of error was drawn, but it was then anticipated that by the time these observations were completed, the numbers of convalescents and moribunds would equalise in both the series, and thus eliminate all errors. This anticipation has, however, not been realised in actual practice and hence the inaccuracy of the above results. It appears that the serum cases had 139 moribunds, and the controls 145, so that the former had an advantage of 6 less deaths over the latter. The convalescents numbered 28 on the serum side, whereas there were 38 on the control, and here the latter had an advantage of 10 more recoveries over the former. The only way, therefore, to arrive at strict and right accuracy is to exclude all the moribunds and all the convalescents from both sides, and then to compare the results in the remaining. And if that is done, the results stand as follows :—

	No.	Died.	Recovered.	Percentage of Mortality.	Percentage of Recovery
Serum cases	313	189	124	60·38	39·62
Non-serum cases	297	237	60	79·79	20·21

There remains, after exclusion, 313 serum cases, and of these 189 died, and 124 recovered, showing a mortality rate of 60·38 per cent. and, therefore, a recovery rate of 39·62 per cent. Similarly the non-serum cases total 297, and of these 237 died, and 60 recovered, showing a mortality rate of 79·79 per cent. and therefore a recovery rate of 20·21 per cent.

The difference, therefore, in favour of the serum treatment is 19·41 per cent. and this represents the actual value of the serum in those cases that are really acute and fit for treatment, and it is 8·16 per cent. higher than that in all cases where these disturbing factors are not eliminated.

These differences in the mortality or recovery rates do not represent the full value of the serum treatment and that could only be arrived at by adopting Professor Haffkine's system (which has been approved of by the leading medical journals of Great Britain) of calculating the rates of recovery ratio between the inoculated and the non-inoculated. If that procedure is adopted for the serum and non-serum cases, it works out that the ratio of recovery is as 1·55 of serum to one of control and 1·96 of serum to 1 of control in all cases, and after the exclusion of moribunds and convalescents in both, respectively. That is, if out of a given number, 100 patients recover under ordinary treatment, the same number, if treated with the serum, would give 155 recoveries in one case and 196 in the other, or to put it in another way, the serum treatment increases the recovery rate by 55 per cent. in all cases and by 96 per cent. if the moribunds and convalescents be excluded.

These results must be considered sufficiently satisfactory in the light of our knowledge of Plague, and its high mortality, regard being had to the fact that the serum treatment of Plague is still in its infancy and requires further research and observation in order to put it on a proper basis.

Mortality rates by castes.—In the last report, the mortality rate by castes was tabulated up to the end of May 1899. The following table gives the figures for 12 months ending 31st May 1900:—

Castes.	No.	Died.	Recovered.	Percentage of Mortality.
Hindus	883	671	212	79·50
Mussulmans	48	34	14	70·83
Native Christians	82	52	30	63·41
Parsies	16	14	2	87·50
Beni Israel ... ..	.....	.....	.....	.....
Total	1,029	771	258	74·92

The following table shows the mortality rate by castes in all the plague patients admitted into the Hospital from September 1896 to June 1900 :—

Castes.	No.	Died.	Recovered.	Percentage of Mortality.
Hindus	5,018	3,747	1,271	74·67
Mussalmans	356	234	122	65·73
Native Christians	460	296	164	64·34
Parsees	36	21	15	58·33
Beni Israel	21	14	7	66·66
Total	5,891	4,312	1,579	73·19

The Hindus numbered 5,018 out of a total of 5,891, and the mortality amongst them was the highest, *viz.*—74·67 per cent. Musalmans and Christians numbered 356 and 460 and their mortality rates were 65·73 and 64·34 per cent., respectively. The number of Beni Israels and Parsees is too small for purposes of comparison.

Mortality rates by sexes:—The following tables show the mortality rates by sexes of all the castes for the 12 months ending 31st May 1900, and for all the patients admitted since 1896:—

Sex.	Number.	Died.	Recovered.	Percentage of Mortality.
Males	665	518	147	77·89
Females	215	166	49	77·20
Children	149	87	62	58·38
Total	1,029	771	258	74·92

Sex.	No.	Died.	Recovered.	Percentage of Mortality.
Males	4,158	3,091	1,067	74·33
Females	1,199	873	326	72·94
Children	534	348	186	65·16
Total	5,891	4,312	1,579	73·19

Comparing the mortality rates amongst the sexes of all castes, it appears that children have the best chances of recovery, and show the least mortality—65·16 per cent.; females come next with 72·94 per cent. and males have the highest rate 74·33 per cent. This difference between the sexes does not hold good in individual castes as the following tables demonstrate. Children, however, have the least mortality in all the various castes :—

Hindus.

Sex.	Number.	Died.	Recovered.	Percentage of Mortality.
Males... ..	3,503	2,673	830	76·30
Females	1,046	764	282	73·04
Children	469	310	159	66·09
Total	5,018	3,747	1,271	74·67

Mussalmans.

Sex.				Number.	Died.	Recovered.	Percentage of Mortality.
Males...	...	...	...	298	192	106	64·76
Females	...	...	...	41	32	9	78·04
Children	...	...	...	17	10	7	58·82
Total				356	234	122	65·73

Native Christians.

Sex.				Number.	Died.	Recovered.	Percentage of Mortality.
Males...	...	...	...	323	206	117	63·77
Females	...	...	...	98	67	31	68·36
Children	...	...	...	39	23	16	58·97
Total				460	296	164	64·34

Parsees.

Sex.				Number.	Died.	Recovered.	Percentage of Mortality.
Males...	...	...	...	24	13	11	54·16
Females	...	...	...	10	7	3	70·00
Children	...	...	...	2	1	1	50·00
Total				36	21	15	58·33

Beni Israels.

Sex.				Number.	Died.	Recovered.	Percentage of Mortality.
Males...	...	...	...	10	7	3	70·00
Females	...	...	...	4	3	1	75·00
Children	...	...	...	7	4	3	57·14
Total				21	14	7	66·66

A comparison between the mortality rates of sexes in Hindus, Mussalmans and Native Christians becomes very instructive and may be shown as follows :—

—				Males.	Females.	Children.	Total.
Hindus	...	...	...	76·30	73·04	66·09	74·67
Mussalmans	...	...	...	64·76	78·04	58·82	65·73
Native Christians	...	...	...	63·77	68·36	58·97	64·34

The mortality rate in children is lowest in all. Mussalmans and Native Christian children being almost equal, whilst Hindus are higher by 7 per cent. The Mussalman females show the highest mortality in any sex of any caste (78·04 per cent). Native Christian females, the lowest among females, and Hindu females stand between these at 73·04 per cent. Amongst males, Native Christians are the lowest, then come Mussalmans one per cent. higher and lastly Hindus with over 12 per cent. higher mortality than Mussalmans, whilst Hindu females show a higher mortality than children and lower than males. Mussalmans and Native Christian females have the highest mortality rates, amongst their individual castes, being higher than males and children in each case.

APPENDIX No. I.

A paper on Professor Lustig's Curative Plague Serum.

A paper was read at a meeting of the "Bombay Medical Union" on the 21st of April, 1900, by Dr. A. Mayr, of the Municipal Laboratory, Parel. Sir Bhalchandra Krishna occupied the chair. The following is the substance of the paper :—

Two years ago Mr. W. M. Haffkine, Sc. D., C.I.E., expounded in this hall the facts relating to the efficacy of the preventive treatment of plague to the Medical Profession of Bombay in order to enable them to form their own opinion on the subject ; to-day I ask your permission to do the same with regard to the curative treatment, the experimental stage of which—I am glad to say—has been brought to a successful termination.

The treatment with Professor Lustig's curative plague serum, in the manufacture of which Dr. G. Polverini and myself are engaged at present, was commenced at the Arthur Road Hospital in March 1898, under the direction of Khan Bahadur Dr. N. H. Choksy, the Medical Officer in charge, to whom the application of the serum was entrusted and is still being continued there. Till May 1899, the patients were selected for treatment ; since then they are taken alternately as they are admitted. The clinical selection, which recommended itself naturally to the physician, has come in for much adverse criticism, and the results obtained by it have been questioned. It is not my intention here to vindicate the selection ; the reasons which prompted it in the beginning have been laid down fully in a report to the Municipal Commissioner. What I am tempted to say here is, that many disappointments which followed the announcement of curative results in other diseases and have discredited serotherapy would have been avoided, if exhaustive clinical investigation had preceded the statistical conclusions. The clinical investigation gives us the only possible means to fix approximately the minimum number of observations which is necessary in order to eliminate essential errors of subsequent statistics. I may be allowed to quote a medical paper on the subject. Writing on the results of the serum treatment of diphtheria the *British Physician* says : "When a procedure or a theory is on its trial, selection, with the view not of emphasising its advantages, but simply of giving it a fair trial by excluding disturbing and antagonising influences, is justifiable, indeed necessary, since such factors tend to obscure the main issue."

The guiding principles of selection were two : exclusion of patients of the later days of disease, and of moribund and mild cases. No undue advantage accrued to the serum treatment from this selection, as the patients of the earlier days show the highest mortality in hospitals, whereas the exclusion of moribunds was irrelevant, their place being taken, not by mild cases, but by such, as would have died later on under the ordinary treatment. Sudden changes for the worse being so common in plague there were not seldom errors of prognosis ; in fact, the selected cases showed 15 per cent. deaths within the first 24 hours. But before entering into statistical details of the hospital, I may be permitted to give some particulars regarding the manufacture of the serum.

The axioms of serotherapy are well known to us all. By injecting suitable animals with substances of bacterial origin we are able to confer immunity upon them. The carrier of the immunity is the blood serum which possesses often immunising and also curative properties. The immunising substance used for the manufacture of Professor Lustig's curative plague serum is prepared in the following way : plague bacilli are cultivated in large dishes on a solid culture medium on which they form

a thin layer. The microbes are then scraped off from the surface of the culture medium and dissolved in caustic potash whereby they are killed and completely disintegrated. By neutralisation with acid, the immunising substance, a so-called nucleoproteid is precipitated in large white flakes. The proteid is then dissolved in carbonate of soda and used for the immunisation of horses. After 6 or 7 immunising injections the horses are bled and their serum is used for treatment.

During the time of selection, 403 patients were treated with the serum at the Arthur Road Hospital, 154 of whom recovered, the rate of recovery being 38·2 per cent., 1,190 cases were under the ordinary treatment and had 233 recoveries or a rate of 19·5 per cent. If we compare these figures we see that the serum gave twice as many recoveries as the ordinary treatment. The increase can only be credited to the serum, if it was not due to the selection. To investigate this we have two means: first, comparison of the recovery rate of the non-serum patients with that of the Arthur Road Hospital at a time when the serum was not used, and, secondly, comparison with that of other hospitals. No serum was available during the inter-epidemic months of November and December, 1898, and January, 1899. The admissions were 273 with 51 recoveries or 18·6 per cent., being even less than in the non-serum patients of the serum period. The Mahratta and Modikhana Hospitals had 4,762 admissions from February, 1898, till June, 1899, the 3 abovementioned months being excluded. The recoveries were 941 or 19·7 per cent. The selection has, therefore, not lowered the recovery-rate of the non-serum patients at the Arthur Road Hospital, and the increase on the serum side is real, and must be attributed to the serum. The crucial test for its efficacy is given by the higher total recovery-rate of the Arthur Road Hospital, when compared with that of the two other hospitals. The Mahratta and Modikhana Hospitals had a recovery-rate of 19·76 per cent. in 4,762 patients, and the Arthur Road Hospital a rate of 24·29 per cent. in a total of 1,593 patients. The increase is 4·5 per cent. in favour of the latter, although only one-fourth of all the patients received specific treatment.

That the increase of the recovery-rate at the Arthur Road Hospital was due to the serum is made evident also by the following figures: From February to November, 1898, the serum was used during the height of the epidemic and during its recrudescence; the total admissions were 663 with 186 recoveries or 28 per cent. From October, 1898, till February, 1899, during the inter-epidemic months no serum was available. The admissions were 273 with 51 recoveries or 18·6 per cent. From January to June, 1899, during the worst epidemic Bombay has gone through, the serum was again used. The admissions were 930 with 201 recoveries or 21·6 per cent. The total recovery-rate was therefore higher in both the serum periods than in the intermediate period, although, considering the epidemiological conditions the contrary might have been expected.

That the higher total recovery-rate at the Arthur Road Hospital during the serum periods was due to the treatment, and not to other influences, is further proved by the fact that the rate increased in the months of the beginning of the treatment in spite of the rising epidemic. The rising of the epidemic can be demonstrated by the increase of the mortality in the whole City of Bombay and in the Maratha Hospital in the corresponding months. The City of Bombay shows a mortality of 94·5 per cent. in February 1898, rising to 100 per cent. in March, and of 84·7 per cent. in January 1899, rising to 87·4 per cent. in February. The Maratha Hospital had a mortality of 81·2 per cent. in February 1898, rising to 87·8 per cent. in March, and of 80·5 per cent. in January 1899, rising to 83·5 per cent. in February. The Arthur Road Hospital on the contrary had a mortality of 78 per cent. in February 1898, falling to 75·1 per cent. in March, and of 83·7 per cent. in January 1899, falling to 79·3 per cent. in February.

The influence of the serum treatment showed itself not only in the saving of life but also in the prolongation of life in patients who eventually died. The prolongation of life is proved by the reduction of the total deaths within the first 48 hours after admission, which amounts to 8 per cent., the corresponding figures being 57 per cent. for the intermediate period and 49 per cent. for the whole serum period.

The demonstration for the time of the alternative treatment is simple. From April, 1899, to April of this year, 361 patients received specific treatment and had 122 recoveries or a rate of 33·8 per cent. An equal number was under the ordinary treatment and had 77 recoveries or 21·3 per cent. The recovery-rate on the serum side shows, therefore, an absolute increase of 12·5 per cent. It might properly be objected—and that is one of the drawbacks of the alternative method—that the evidence is not conclusive, if it cannot be shown that the total recovery-rate at the Arthur Road Hospital was higher than in other hospitals. In order to compare the total recovery-rate of the Arthur Road Hospital with that of other hospitals we have to add to the 722 cases treated alternately, 36 cases with only 5 recoveries in which cases the diagnosis could not be made in time to take them for the alternate treatment. (Only such cases were dealt with which under diagnosis showed undoubted symptoms of plague.) The total admissions stand thus at 758 with 204 recoveries, the rate being 26·9 per cent.

The Maratha Hospital had 2,131 admissions with 455 recoveries, the rate being 21·35 per cent., almost identical with the rate of the non-serum patients of the Arthur Road Hospital. The total recovery-rate at the Arthur Road Hospital was, therefore, in the same proportion, higher than that of the other hospital, as the difference of 12·5 per cent. between serum and non-serum cases lead to expect. As the Maratha Hospital had 3,378 admissions with 646 recoveries or 19·1 per cent. during the time of selection the figures for the whole time of the serum treatment stand thus: 5,509 admissions with 1,101 recoveries or 19·9 per cent. at the Maratha Hospital and 2,351 admissions with 591 recoveries or 25 per cent. at the Arthur Road Hospital. The Arthur Road Hospital gave therefore 5 per cent. more chances of recovery since the beginning of the serum treatment, although only one-third of the patients received it. The patients of the Arthur Road Hospital belonging almost exclusively to the lowest castes have, moreover, less individual resistance than the Marathas.

Although the concurrence of all this evidence pointing to one conclusion is sufficient to put the efficacy of the serum beyond any reasonable doubt, I will not omit to mention another fact which was conclusive to the experimenters themselves, at a time when statistics were not available. I refer to the marked difference in the curative results obtained by sera derived from different horses. Whereas the serum of horse No. 1 immunised in Italy gave 27 per cent. recoveries in 90 treated patients, the three other horses, also immunised in Italy, gave 53 per cent. in 155 treated cases. Similar differences are observed in the results obtained by the sera prepared here. Thus, the serum of horse No. 1, gave 34 recoveries in 122 patients, and the serum of horse No. 4, gave 51 recoveries in 125 patients. The differences are so remarkable that they cannot be due to the chances of distribution, but must be explained by a varying degree of efficacy. I do not think it necessary to add more to the above. There is material enough for an unbiassed mind to form a judgment upon, and I now pass on to the application of the serum and to the clinical features of the treatment.

First of all I should like to state emphatically that the serum is perfectly innocuous even in larger doses than are needed for treatment. There seems to exist a superstitious fear of the serum, which is warranted neither by our experience

nor by that of serotherapy generally. The curative plague serum has moreover been tried in other diseases and also on healthy beings without causing any inconvenience.

The serum is usually injected under the skin once or twice a day. The single dose for an adult is from 20 to 60 c. c., for children about the half. The injections do not cause special pain and no local irritation or abscesses if the syringe is kept septically clean, and the skin is well disinfected. The effect of an injection becomes manifest within 12 hours. The temperature either does not rise, or falls distinctly, the arterial pressure is increased, the delirium subsides, the bubo is less tender and diminishes sometimes considerably. Improvement after the first injection is generally observable, although it may not be progressive. This latter cannot be surprising if we consider the probable mode of action of the remedy. The serum induces a reaction in the tissues of the body, stimulating them to the production of bactericidal or antitoxic substances by which the infection is overcome, or its poison neutralised. Against degenerative changes which may have been already established in different organs, principally in the heart, before the patient comes under treatment, the serum is powerless. The gravity of such degenerations is determined by three factors: the virulence of infection; the time since the beginning of the infection; and the individual resistance. As we can neither diminish the virulence nor increase the resistance, we must try to shorten the time, that is, we must resort to the treatment as early as possible. This is a point that cannot be emphasised too strongly. The earliest treatment is essential for the cure of a disease which leads to death usually within 4 days and sets up irreparable changes in the heart within 24 hours and even less. No time should be lost as every hour's delay may prove fatal, especially as the serum itself needs some time to develop its action. Fortunately the diagnosis of plague in times of epidemic is so easy that in 90 per cent. of cases it might be made by a layman.

Also symptomatic treatment has not to be neglected. The judicious use of alcoholic stimulants and cardiac remedies when the heart shows signs of impending failure, or cold sponging when the fever is very high, will prove of great value.

The quality of the pulse, as an index of the condition of the heart is chiefly of importance for the prognosis of patients treated with the serum. However alarming the other symptoms may be, so long as the pulse can be felt well and is not too frequent (*i. e.*, over 140) and soft, there is always the possibility of recovery. Certainly also in such cases collapse and death may follow very soon after injection. Such coincidence is not to be wondered at if we remember how often unexpected sudden changes for the worse occur in plague. If the pulse be almost imperceptible very soft, and frequent, or intermittent then even serum treatment is of no avail and had better be abandoned. There are limits for every remedy and the experienced physician ought to know and to respect them.

The best results are obtained in the forms of plague in which recovery by nature is more frequent, as in simple bubonic plague. Also septicæmic forms can be cured if they are treated on the first day. No results have been obtained in plague pneumonia. Too few cases have been treated to form a definite opinion whether this worst type of plague infection is accessible to cure or not. As regards class it can be said with certainty that children give the best results, no doubt because the resistance of the heart is greater than in adults.

The observations outside the hospital which interest practitioners most, are but scanty. Thirty-two cases have been treated and recorded. Nineteen of them recovered. The cases were without exception very severe, and the majority of them far advanced, as the public seems to look upon the serum as the last resource to be

tried when all others have failed. Although the number is too small for general conclusions the favourable influence of better conditions of life is unmistakable. It is to be hoped that in the future the serum will have an extensive trial in private practice where it will show to full advantage.

I have but few more remarks to make and they bear on the future of the serum-treatment of plague. Going over its history in this City, and recollecting the exaggerated expectations with which Dr. Yersin was received in 1897, I should not be surprised to hear some one exclaim: Only twelve per cent. ! That is nothing to speak of ! There is no arguing with such a cold-blooded arithmetician. Twelve per cent. is a handsome profit in business ; should it be otherwise where human life is concerned ? Let him ask the twelve per cent. who owe life and health to the serum, if they agree with him, or let him go to our plague hospitals and look at the poor plague-stricken inmates and he may perhaps begin to wonder that even one per cent. could be saved by human intervention. Would he not change his views if he or his family or friends were threatened ? And if we are to adopt Mr. W. M. Haffkine's statistical method of calculating the benefit of plague prevention, the serum shows an increase of fifty-eight per cent. on the actual recovery rate by ordinary treatment. In other words for every hundred who recover by ordinary treatment a hundred and fifty-eight recover by serum treatment. The serum cures one-third and nature but one-fifth of those attacked. Is that not worth while ?

It would be just as great an error to rely entirely upon the curative serum and neglect the prophylaxis. In such a rapid and deadly disease prevention will always be safer than cure. No one would be careless in handling fire just because there was a fire-engine round the corner.

The question whether no improvement is possible, deserves full consideration. I can answer confidently that improvement is certain, the results of the past having been obtained under the most unfavourable conditions.

The serum was on its trial ; the laws how to prepare it best have yet to be laid down ; sera of inferior quality had to be used ; the mode of application to be studied ; while, on the other hand, there were patients of the lowest castes, with little natural resistance and in an advanced stage of disease—only nine per cent. being patients of the first day—ill-fed ; weakened by previous illness, not seldom simultaneously suffering from complications, such as relapsing fever, malaria, phthisis, or infection by cocci—a multitude of “ factors tending to obscure the main issue.”

If we now ask what are the best results we may hope for, we have to distinguish treatment in hospitals from treatment in private practice. There are unfavorable conditions inherent in the treatment in hospitals which we have to reckon with. As long as patients do not avail themselves at the earliest date of the advantages the hospital offers them, the best results will be an increase of the recovery-rate from 20 per cent. to 50 per cent. This increase has already been obtained with the best serum and it will be obtained again, since the regular manufacture of a serum of highest activity is merely a question of time and further experience. The prospects of the serum treatment must not therefore be judged by the average result obtained, but by the best results. If the serum be prepared on a larger scale it will, moreover, be possible to discard the use of inferior sera.

That a further increase cannot be obtained in our large hospitals even with the most active serum, I am led to believe by the following considerations :—

Fifty per cent., and sometimes more, of the patients admitted into the large hospitals die within 48 hours after admission. It is certainly not an accidental coincidence that out of the 51 series, in which the treated cases are divided according to the different bleedings of every horse, only one shows a recovery rate considerably above fifty per cent. But the cases were only twelve and the epidemic declining.

The percentage of patients which in the ordinary course dies within 48 hours after admission, could not be saved even with the best serum. The fate of these patients is unalterable at the moment they reach the hospital, they are *morituri*—doomed to die. The reduction of a mortality of 80 per cent. to the insignificant figure which was demanded by those who were ignorant of the clinical features of plague is impossible in hospitals. It remains to be seen if the intravenous injections of the serum which could be made only occasionally, owing to the pressure of work, or a serum of still higher activity, or the excision of solitary buboes in suitable cases, or the combination with some drug treatment, will increase the recovery-rate still further, thus proving my views to be erroneous. The above makes it clear that the limits of the efficacy are not determined by the remedy, but by circumstances of the hospital. In private practice, where no such limitations exist, and the greater individual resistance is a potent factor in aid of the treatment the efficacy of a strong serum will be almost unlimited and in direct proportion to promptitude with which the diagnosis is established and the treatment inaugurated. Grave responsibility devolves for this reason upon the physician who in times of plague loses precious hours musing over all possible improbabilities to which a tender bubo is due!

I must not be misunderstood.

The day may still be far ahead when, owing to the serum treatment, plague will have lost some of its terrors. Death does not give up its prey so readily.

But we are on the right path, we see the goal for which to strive with patient confidence.

That has been fully realised by Lieut.-Col. T. S. Wilkins, D. S. O., I. M. S., Special Medical Officer, Plague Operations, who took great interest and pains in watching personally the progress of the experiments at the Arthur Road Hospital. He wrote as far back as June, 1899, to the Municipal Commissioner: "I personally am of the opinion that the manufacture of this serum should be continued as long as the results are hopeful, which they decidedly are, or until some other more potent remedy is found to act on this most fatal disease."

APPENDIX No. **II.**

FROM

G. POLVERINI, M. D.,

OFFICER IN CHARGE, MUNICIPAL LABORATORY,

PAREL.

TO

THE MUNICIPAL COMMISSIONER FOR THE CITY OF BOMBAY

THROUGH THE HEALTH OFFICER,

BOMBAY MUNICIPALITY.

MUNICIPAL LABORATORY, PAREL,

17th November 1899.

SIR,

I have the honour to submit a report on the experiments carried out on behalf of the Bombay Municipality from the 12th of March 1898 to the 31st of May 1899 with Prof. Lustig's curative plague serum in hospitals, and also in private practice in Bombay. In the preparation of this Report I had the advantage of the valuable collaboration of Dr. A. Mayr, at present assisting me in the manufacture of the serum. I also attach herewith a report from Veterinary Surgeon S. N. Ranina on the horses immunised in Bombay for the preparation of the serum.

I have the honour to be

Sir,

Your most obedient servant,

G. POLVERINI, M. D.,

Officer in charge, Municipal Laboratory.

Report on 475 Plague Cases treated in Bombay with Professor Lustig's Curative Serum.

BY G. POLVERINI, M.D.

SEROTHERAPY, in general, is based on the principle that suitable animals, when injected with the germs of a particular disease, or with their metabolic products, or with both, acquire immunity against the disease, and that the blood serum of animals so immunised, besides possessing *immunising* qualities, shows often decided *curative* effects as well.

For reasons which would take too long to explain here, Professor Lustig was led to try the following method of immunisation against plague infection, *viz.*, the injection of animals with the albuminous substance of which the *body* of plague microbes is chiefly composed. This albuminous substance is a nucleoproteid and can be isolated from the bodies of plague bacilli in the following way. When plague microbes are cultivated on large Agar-Agar plates, they form a thin layer which is scraped off from the surface of the solid culture medium and treated with caustic potash. By the strong alkali the microbes are not only killed, but also completely disintegrated and dissolved. To the resulting solution, which is of a mucilaginous consistence, acetic acid is added till a white and flocculent precipitate is thrown down, which changes on drying to a brown amorphous mass, without losing its properties. This precipitate is the above-mentioned nucleoproteid *free* from the metabolic products of the plague bacteria, and is used for immunisation after solution in Carbonate of Soda.

Numerous experiments confirmed Professor Lustig in his idea, that the immunisation with the nucleoproteid protects animals susceptible to plague, *e. g.*, mice, rats, guinea-pigs and monkeys, and that the blood serum of these animals has marked curative effects, if injected, into other infected animals.

Not only susceptible animals are able to produce a curative serum after immunisation, but also others, like horses, &c., which are refractory to plague infection.

The presumption that the serum from immunised animals, more especially from horses, may act identically in human beings who have contracted plague by natural infection, is supported by the experience gained in the serum treatment of other diseases, and the attempt to apply such serum as a remedy in man is therefore scientifically justified.

Hence, for the preparation of the curative plague serum, as asked for by the Bombay Municipality, eleven horses have been immunised by injecting them under the skin at given intervals, with increasing quantities of the already mentioned proteid.

Five of the horses were immunised in Florence by Professor Lustig and six in Bombay by Professor Galeotti and the undersigned.

The horses re-act to the injections with fever, general signs of sickness and swelling at the seat of injection. These symptoms subside usually within a fortnight, the horses losing much flesh during this time.

For more particulars on this subject, I refer to the adjoined report of Veterinary Surgeon Ranina.*

When a horse has recovered from the effects of one injection, a second one is made, and so on, until immunisation is obtained.

The quantity to be injected, and the intervals between the single injections, have been subjected to some variations in order to find out the best and shortest way of immunisation. Valuable data have thus been obtained, which require, however, further confirmation.

Generally, it can be said that the efficacy of the serum is, within certain limits, in direct proportion to the quantity of the immunising material injected.

The time required for efficient immunisation before the first bleeding is, on the average, 3 to 4 months.

The horses are bled from the jugular vein. Blood to the amount of 5 to 7 litres is withdrawn and kept in ice till coagulation has taken place. The separated serum is then decanted into sterile bottles, fitted with rubber corks, and kept in a dark and cool place.

In Bombay, the serum was usually prepared just before it was needed, in order to prevent possible deterioration. The serum sent out from Florence (for the transport of which special arrangements had been made with the P. & O. Co.) arrived sometimes in an altered condition and could not all be used.

It is needless to say that all manipulations involved in the preparation have to be conducted with extreme precautions in order to avoid accidental contamination.

When the horses have recovered from one bleeding, the immunisation begins again and is achieved in shorter time. So a horse may be bled and immunised three to four times, giving altogether about ten litres of serum, which is approximately sufficient for the treatment of 100 patients. I say approximately, as, on the one hand, the same amount of blood gives sometimes less serum, owing to incomplete coagulation: whereas, on the other hand, a serum with inferior curative properties has to be used in larger doses.

After the fourth bleeding, the horses are, as far as experience goes, so reduced in their vitality, that they are considered unfit for further immunisation. It may even be that a horse becomes unfit much earlier, as it happened with horse No. 6 immunised at Parel, which, after the first bleeding, never recovered again.

Before using the serum in human beings, it was always tried on animals to ascertain its curative properties. The single dose used for treatment in patients was on an average 20 c.c. ($5\frac{1}{2}$ drachms), the largest single dose was 40 c.c., the largest collective dose 200 c.c.

The injections were made usually under the skin of the arm or thigh after careful disinfection. In a few moribund patients, injections directly into a vein were tried, but without effect. In others, the serum was injected into the bubo itself: this practice was abandoned, as it was very painful and without better results.

The injection of the serum does not cause special pain and no local reaction whatever. The serum is absorbed in a few minutes. Abscesses never occur, if the disinfection of the skin and syringe is carefully done; in some cases, an urticarial rash appeared after injection.

* This report only accompanies the Commissioner's copy.

The serum derived from different horses showed very different curative properties, which always corresponded with the results of the experiments on animals. As the *difference* of the results obtained from different sera is one of the *chief proofs* of the efficacy of the serum treatment, the results are given in detail in the following table:—

(a.) *Horses immunised at Florence.*

Serum from horse.	No. of Patients treated.	Recoveries.	Deaths.	Percentage of recovery.
No. 1 ...	90	25	65	27·77
No. 2 ...	42	22	20	52·38
No. 3 ...	70	38	32	54·28
No. 4 ...	43	23	20	53·48
No. 5 ...	12	4	8	33·33
Total ...	257	112	145	43·57

(b.) *Horses immunised in Bombay.*

Serum from horse.	No. of Patients treated.	Recoveries.	Deaths.	Percentage of recovery.
No. 1 ...	47	17	30	36·17
No. 2 ...	24	5	19	20·83
No. 3 ...	31	14	17	45·16
No. 4 ...	51	19	32	37·25
No. 5 ...	52	15	37	28·84
No. 6 ...	13	5	8	38·45
Total ...	218	75	143	34·40

(a) Some serum from horses Nos. 2 and 4 immunised in Florence arrived deteriorated in Bombay and could not be used. Horse No. 5 could not be further immunised, as after the plague cases at Vienna the working with plague microbes was not allowed in Italy.

(b) The horses immunised at Parel have been twice bled except Nos. 2 and 6, which were once bled; the latter became unfit for use after the first bleeding.

The table shows that the serum from horse No. 1 immunised in Florence with which the treatment was commenced in March 1898, gave throughout little satisfaction, as out of 90 patients treated 65 died, and 25 only recovered, giving a recovery rate of 27·77 %. The serum of horse No. 3, also immunised in Florence, gave the best results with 38 recoveries in 70 cases treated, equal to a recovery rate of 54·28 %.

This difference is independent from other influences, as both sera were used under the same circumstances in the Arthur Road Hospital. I think it worth while to enter into some details of it.

From the 12th to the 29th of March the serum from horse No. 1 was used; 24 patients were injected, 18 of whom died and 6 recovered.

From the 28th of March to the 9th of April, the serum from horse No. 3 was tried; 19 patients were treated, of whom 10 died and 9 recovered.

From the 12th to the 23rd of April, the serum from horse No. 1 was again used (2nd bleeding); 41 patients were treated, of whom only 11 recovered.

From the 29th of April to the 12th of May the serum from horse No. 3 (2nd bleeding) was tried. Of 24 cases treated, the results were 12 recoveries and 12 deaths.

From the 22nd to the 26th of May the serum of horse No. 1 (3rd bleeding) was once more used; 6 patients were treated, of whom 1 recovered.

From the 12th of May to the 3rd of June the serum of horse No. 3 (3rd bleeding) was again employed; 12 patients were treated, of whom 9 recovered.

Simultaneously, with the serum of horse No. 1, the sera from horses Nos. 2 and 4 were used; of 22 patients treated, 10 recovered. The serum of horse No. 1 gave, therefore, in every instance less recoveries than any of the other sera. The occurrence of a sequence of inferior results from one serum (which results were, however, still better than those obtained by the ordinary treatment) can only be explained by a variation in the degree of efficacy. The difference in the results, 18 recoveries in 71 patients treated with the serum of horse No. 1, and 40 recoveries in 77 treated with the serum of the other horses, is so considerable that it cannot be due to chance.

The recovery rate (*vide* table, page 3) obtained from the use of the serum prepared in Florence is considerably reduced by the failure of the first horse with the serum of which the largest number of patients was treated. For, if from 257 cases treated with the serum obtained from Florence are deducted those injected with the serum from horse No. 1, the recovery rate is 52.09 % instead of 43.57 %.

The fact that the later bleedings of this horse did not yield better serum tends to show that the horse was *a priori* refractory to effective immunisation. In fact, some horses seem never to give active serum. This is also observed in the preparation of other sera, as, for example, in the preparation of the anti-diphtheric serum. A knowledge beforehand as to whether a horse will or will not give an active plague serum is as yet impossible.

The table given above shows further that the recovery rate from the serum prepared in Bombay is up to now 9 % less than from the serum prepared in Italy. It is difficult at present to account for this. It may be due to the increased virulence of the disease in 1899, and to the confidence with which the most desperate cases were subjected to the treatment by Dr. Choksy, the Medical Superintendent of the Arthur Road Hospital; or it may be explained by the fact that the horses have been bled only twice, as there are strong reasons to believe that the serum improves with every bleeding. The race of the horses and the climatic conditions in India might also lessen the resistance of the animals to the immunising injections and impair their faculty to produce the substance which is the curative agent of the serum.

The observations recorded in this report were made from the 12th of March to the 31st of October 1898 with the serum prepared in Italy, and from the 1st of February to the 31st of May 1899 with the serum prepared in Bombay.

The total number of patients treated during this time was 475. Serum for 50 patients was, moreover, given to the Indian Plague Commission by order of the Municipal Commissioner, and some serum was used for the necessary control experiments on animals.

For the preparation of the serum 25 bleedings were made, and 78 immunising injections performed.

The patients were treated in hospitals and in private practice as follows :—

	No. of Patients treated.	Recoveries.	Deaths.	Percentage of recovery.
Arthur Road Hospital	403	154	249	38·21
Maratha Hospital	28	11	17	39·28
Government House, Parel	12	3	9	25·00
Private	32	19	13	59·37
Total	475	187	288	39·36

The rate of recovery was therefore 39·36 per cent.

These results appear in themselves satisfactory if we compare them with the following figures :—

At the Arthur Road Hospital, 1,190 patients were treated without serum during the same period, 233 of whom recovered, equal to a recovery rate of 19·57 per cent.

At the Maratha Hospital, 3,378 patients were similarly treated, of whom 646 recovered, equal to a recovery of 19·12 per cent.

At the Modikhana Hospital, 1,384 patients were treated, of whom 295 recovered, equal to a recovery rate of 21·31 per cent.

It is interesting to note that for the whole City of Bombay 24,752 attacks from plague have been recorded with 21,193 deaths, equal to a recovery rate of 14·37 per cent.

But it would be entirely misleading, as statistics usually are, if not drawn from very large numbers, to presume that the recovery rate of 39·36 per cent. represents the whole efficacy of the serum treatment either in the past or for the future.

To come to a true judgment of the value of the serum treatment we have not only to consider statistics, but also all the circumstances of the preparation and application of the serum, which cannot be expressed in mere numbers, although they may have influenced the results.

As to the preparation it has to be borne in mind that the manufacture of a curative serum is not only the highest, but also one of the most complex problems of practical medicine, the complete solution of which is not to be arrived at by the first attempt, but by repeated experiments. This is instanced in the case of the diphtheria serum. It took many years and numerous experiments before a satisfactory curative serum was obtained.

It has further to be remembered that this report gives the results of a treatment in its *experimental stage*, in which the dose of the remedy, the mode of its application, and its effects under varying conditions, had to be ascertained; so that the investigations had to be carried on under conditions unfavourable for statistical results.

But before dealing in detail with the circumstances of the application of the serum, I think it necessary to say a few words about the method adopted in the experiments, as the results obtained by this method have been questioned.

Whenever a new remedy is recommended there are two questions which have to be decided in regard to it :—(1), Is it a remedy at all ? (2), Is it generally applicable as a remedy ?

The first question can be solved immediately by the physician; the solution of the latter must be left to time and wider experience.

The attempt to solve both questions at once by statistics has been shown to lead to errors.

We can ascertain the action of a substance on *healthy beings* by statistics, as we are able to equalize approximately by selection the conditions of the individuals experimented upon: such equalising selection is impracticable as soon as we have to do with *sick persons*. Sickness introduces so many unknown conditions, that comparison is well nigh impossible. The sick person is an entity by himself, not to be compared with anybody but himself. This fact must have struck even a layman, who had the opportunity of seeing the efficacy of curative treatment tested by the so-called "control case" method, or by the method of "alternative cases." The error of such methods can only be eliminated when the objects of comparison are so *numerous*, that we may expect, according to the law of probability, to find on both sides a *majority* of corresponding units.

Unfortunately, we can never know beforehand how large the number of observations must be in a particular instance, in order to eliminate the errors of statistics as the number must differ with the disease and with the efficacy of the remedy itself. Thus the number may be small in a disease, like typhoid fever, where there is plenty of time for intervention; it must be much larger in plague with its rapid course, high mortality, and sudden deaths.

As the accuracy of conclusions arrived at by statistics is in direct proportion to the number of observations, becoming absolute if the number is infinite, it follows that with the decreasing number, the accuracy must decrease till it falls to zero. In such a case, statistics do not allow of any conclusion. If we reduce the number of observations further still, the accuracy may even become negative and the conclusions drawn from such observations may be positively wrong and contrary to the truth.

It is this possibility of giving results contrary to the truth, which often discredits statistics as a method of investigation.

I do not hesitate, therefore, to state here that the clinical method of selecting such cases, as were thought accessible to cure, approved of by the Health Officer, Col. Weir, is the only one employed by the science of medicine at the sick bed in similar *original* investigations, and that the experimenters could not have adopted a statistical one without derogating from their dignity as physicians, and without putting themselves in contradiction to the principles of their science.

In science generally statistical methods of investigation are only resorted to when other more reliable means are not applicable.

Medicine especially, having for its object the human body, with its thousand fold varying abnormal conditions produced by disease, excludes statistical methods from the sick room, as statistics are incompatible with the first principle of medicine—the principle of *individualisation*.

But, even setting aside scientific principles, there was also a practical reason for clinical selection. It was necessary to come to a conclusion in short time and with little material, as it was not known how long the experiments could be continued. Under these circumstances this could not be done by statistics which had to be based on large numbers in order to avoid essential errors, on numbers much larger than were considered sufficient by some.

In fact, within a few weeks after the beginning of the experiments, no doubt was left in the minds of the experimenters that the treatment was effective, although the results were, at the time, anything but favourable from a statistical point of view.

And last, but not least, I cannot omit to say that the statistical method in its application to human beings is repulsive to the physician who does not look upon patients as mere objects of experiment, but as *sui similis* when he is called upon to help and to cure.

We come now to explain the principles followed in the selection of cases.

The first principle was to select for treatment cases which were admitted in the first days of disease; for it is obvious that, in a disease which leads usually to death within four days, early treatment give the only chance of recovery.

It has been said that this principle brings about the selection of cases which have the greatest chance of natural recovery. To this I can give the answer of Dr. Simonds quoted in his report on the patients treated by him at Karachi with Roux serum, that it is a "gross error."

Experience and statistics show that in hospitals the highest mortality is just amongst the patients admitted in the first days of disease. Thus, this principle leads, on the contrary, to the selection of patients the mortality in whom is higher than the average.

Considering further, that, on the one hand, more than 30 per cent. of the patients admitted in the large hospitals are evidently moribund and beyond any possibility of recovery, dying within 24 hours and even less after admission, and that, on the other hand, about 20 per cent. recover under ordinary treatment, it was thought best to try to exclude both categories from the serum treatment. The first, because it could not reasonably be expected that any treatment could be effective in patients already showing signs of approaching death; the second, for mere economy and in order to meet beforehand the objection that the treated patients would have recovered without specific treatment. In itself there is naturally no reason to exclude the latter: in such patients the recovery may be hastened and sequelæ prevented. It would, moreover, be unsafe to rely on nature unaided, when the mortality is one of 80 per cent.

It was usually easy to exclude patients recovering by nature from the treatment.

Experience and statistics show again that in hospitals the majority of recoveries by nature takes place in patients admitted in the later stages of the disease, when the battle for life has already been fought and won outside the hospital.

Greater difficulty was, however, experienced in excluding the small number of patients brought to the hospital in the first days of disease, who might have recovered by themselves, and there is no doubt that some such cases came under treatment in consequence of the impossibility of recognising them as such.

But the greatest difficulty was encountered in excluding cases beyond hope of recovery. Unexpected sudden changes, never for the better but always for the worse, are so common in plague, that even the most experienced fail in predicting the course of the disease. So it happened rather often, that death followed some hours after the commencement of the treatment, thus demonstrating the error in prognosis.

It may appear to the superficial observer that the exclusion of moribund cases must have influenced favourably the results of the serum treatment. This is by no means the case. The place of the excluded moribunds was taken by other patients,

who, although not moribund, would have died later on under the ordinary treatment. The decisive factor in the selection is the exclusion of the patients recovering by nature ; and this factor went against the serum treatment. Sometimes no selection was made, *e.g.*, in private practice, and again at the Arthur Road Hospital, when suitable patients came in in small numbers at a time when the urgency of reporting on the progress of the experiments did not allow of any delay. In May 1899, by special request, the cases were taken alternatively for treatment.

In other instances, the cases were selected by the medical officers in charge of the respective hospitals and also so-called "control cases" supposed to be in a similar condition. Sometimes patients known to be hopeless were injected in order to study the effect of the treatment on special or distressing symptoms.

It is thus to be seen that, although selection was the rule, patients came also in other ways under the serum treatment; and it is further clear, that the selection, far from giving undue advantage to the treatment, put it, on the contrary, at distinct disadvantage.

So much for the method of clinical selection.

As to the results claimed for the treatment, it seems to me that they must be accepted as established, if the general recovery rate from plague was at the time, in fact, about 20 per cent, which has been taken as the basis for comparison, and if the higher recovery rate of 39·36 per cent obtained by the serum, was not due to the selection.

To prove this, I shall proceed in the following purposely on statistical lines, and shall confine myself only to the patients treated at the Arthur Road Hospital for whom all the necessary data are at hand.

As an introduction to these statistics I may be permitted to give here shortly, the history of the serum treatment.

The first patients were treated, in June and July 1897, at Poona and Bombay, by Professor Lustig himself. Out of 30 patients selected by the officers in charge of the respective hospitals, 26 recovered and 4 died. It was on the strength of these results that the Bombay Municipality requested Professor Lustig to continue the experiments.

When Professor Galeotti and the undersigned came to Bombay in March 1898, with the serum prepared for the Municipality, they came naturally with high expectations which, however, were not at first fulfilled.

The treatment was commenced on the 12th of March 1898 at the Arthur Road Hospital with the serum of horse No. 1.

The epidemic was raging with unusual severity and seemed to baffle all medical efforts.

No appreciable curative results could be obtained in the first weeks ; and had it not been for the clinical observations showing undoubtedly that the specific treatment was not without beneficial effect, the experiments would have been abandoned at this early stage.

The arrival of a new serum was anxiously awaited. It came on the 26th of March, and with it the solution of the problem. It was obtained from horse No. 3, and was first used on the 28th of March. The difference in the efficacy of the first and second serum was not only unmistakable clinically, but soon also evident numerically as has already been shown in detail (*vide* page 3).

There could not have been a more *conclusive* proof of the efficacy of the treatment than the marked *difference* of the results obtained. The experimenters thought themselves therefore at *this stage*, entitled to the conclusion that by Prof. Lustig's method a serum with high curative properties could be prepared.

Further experience substantiated this belief, although disappointments were not wanting.

The experiments were continued till 31st of October 1898, during a recrudescence of the epidemic, which is known for its high mortality.

The treatment was then discontinued till February 1899, while serum was being prepared locally at the Municipal Laboratory at Parel.

In February 1899, when the severest epidemic Bombay ever saw, was rapidly increasing, the treatment commenced again and has been continued without interruption up to date.

As the bulk of patients were naturally treated when they were numerous, the results reported here have been chiefly obtained during the height of three epidemics of exceptional virulence.

Considering this, and the exclusion of mild cases, and the most unfavourable conditions of application in a large Indian plague hospital, it can be said, without exaggeration, that the serum has been put to a test as severe as can be conceived.

And now to the statistics.

From the 12th of March till the 31st of October 1898, and from the 1st of February till the 31st of May 1899, 403 patients have been treated with the serum at the Arthur Road Hospital, of whom 154 recovered, the recovery rate being 38·21 per cent. During the same time 1,190 patients were treated without serum, with 233 recoveries, the recovery rate being 19·57 per cent. Altogether 1,593 acute cases were admitted into the hospital, 387 of which recovered, the rate being 24·29 per cent.

If the serum has really saved lives, the total recovery rate at the Arthur Road Hospital must have been higher than in other hospitals in which a similar class of patients was admitted. But none of the other public hospitals receives the ordinary low caste patients who form the bulk of admissions at the Arthur Road Hospital; still we shall take for comparison the Maratha and the Modikhana Hospitals and will see what was the recovery rate from plague there during the same period.

At the Maratha Hospitals, 3,378 patients were admitted from the 1st of March till the 31st of October 1898, and from the 1st of February to the 31st of May 1899 of whom 646 recovered; the rate of recovery being 19·12 per cent.

At the Modikhana Hospital, 1,384 patients were admitted during the above period, of whom 295 recovered; the rate of recovery being 21·31 per cent.

In both hospitals together, 4,762 patients were admitted, of whom 941 recovered; the rate being 19·76 per cent.

The recovery rate at the Arthur Road Hospital was therefore 45·3 per cent. higher than in the former two hospitals, although the patients admitted to them are in general, of a better and more resistant class, better fed and, as a rule, earning wages.

It has, moreover, to be noted here that, in the account of the Arthur Road Hospital, 53 convalescent patients are not included, who were transferred from other hospitals which were closed with the decline of the epidemic in 1898. If they be included, the recovery rate of the Arthur Road Hospital is 26·73 per cent. This would probably be the correct number for comparison, as no doubt also the Maratha and Modikhana Hospitals had convalescent admissions in 1898, which are not separated in the records furnished to me. The surplus on recoveries would be in such a case 7 per cent. in favour of the Arthur Road Hospital.

Still, as I cannot give the exact number of such convalescent patients admitted into the other hospitals, I shall not take advantage of the doubt, but base my conclusions on the lower recovery rate of 24·29 per cent.

The average recovery rate of 19·76 per cent. in the two other hospitals enables us to ascertain statistically what advantage the selection gave to the serum treatment.

It is clear that the recovery rate of the non-serum patients of the Arthur Road Hospital ought to have *decreased*, if the increase in the recovery rate of the serum patients was due to the selection.

The recovery rate in the non-serum cases was 19·57 per cent. at the Arthur Road Hospital and 19·76 per cent. in the patients treated at the other two hospitals. The difference, therefore, is 0·19 per cent. This difference may be taken as the numerical expression of the advantage the serum treatment derived from the selection.

To eliminate this advantage, we have to add this difference to the recovery rate of the non-serum patients at the Arthur Road Hospital which is then also 19·76 per cent.

As the recovery rate in the serum cases is 38·21 per cent. the difference of 18·45 per cent. must be credited to the serum.

This number being based on merely statistical calculations, cannot express the real efficiency of the serum treatment, because the experiments were not conducted for statistical purposes.

If we remember that the first principle of selection brought to the serum treatment cases in which the recovery rate is *lower* than the average, and that the second principle excluded, as far as possible, mild cases, in which the rate is *higher* than the average, we arrive at the conclusion that the serum treatment must have favoured the results in the non-serum cases.

In fact, such favourable influence is the necessary consequence of the principles of selection.

Whereas the addition of moribund patients within the limits in which it took place was irrelevant for the recovery rate of the non-serum cases, this rate had to increase, because a larger number of mild cases came to the non-serum side than corresponded to the incidence among the ordinary admissions. Although the advantage the non-serum side thus derived from the selection cannot be put down in figures, it is real and not to be denied. It helps to explain the fact that the recovery rate of the non-serum cases is even higher than that of the patients of the intermediate period, in which the serum was not used, and also that the recovery rate in the non-serum cases is only 0·19 per cent. lower than that of other hospitals receiving patients of better stamina.

That the addition of moribunds to the non-serum cases has not influenced their recovery rate, is shown by the following figures :—

Of the 493 serum cases 63 died within the first 24 hours and 68 within the next 24 hours after the beginning of the treatment. As the day of admission was not always identical with the day of the beginning of the treatment, the respective figures are 52 and 58 in regard to the admission. The serum cases had therefore 27 per cent. deaths within the first 48 hours after admission. For the 1,190 non-serum cases the figures are 445 and 227 respectively. The deaths within the 48 hours are therefore 672 or 56·47 per cent. As is well known, the mortality within the 48 hours after admission is 50 per cent. and more in the large Plague hospitals, and therefore its increase in the non-serum cases is at the most 7 per cent. That a greater number of patients who die within the first 48 hours cannot influence unfavourably the recovery rate, as long as the exchange does not take place in the class of recovering patients, is obvious.

The 7 per cent. more deaths within the first 48 hours after admission in the non-serum cases correspond probably to the number of patients who died a few hours after admission and could not possibly have been taken for treatment, as patients arriving in the evening had to wait till the next morning before the special line of treatment was decided upon by the Medical Officer.

Hence the exclusion of moribunds was due to involuntary causes rather than to anything else. When intentional, it was strictly confined to actually dying patients. That the principles of selection were so rigorously adhered to, reflects great credit to the conscientiousness and ability of Dr. Choksy, by whom the selection was made in the majority of cases.

We have already seen from the comparison with the recovery rate of other hospitals that the selection brought no advantage to the serum treatment. This can be further demonstrated from the records of the Arthur Road Hospital itself. During the months of November and December 1898, and January 1899, the serum treatment was discontinued as no serum was available. During this time 273 patients were admitted, 51 of whom recovered, the rate being 18·68 per cent. or 0·89 per cent. *lower* than in the non-serum cases of the serum period. The total recovery rate of this serum period compared with the above period gives a difference of 5·61 per cent. in favour of the serum. Or we may put it in another way.

From the 12th of March to the 31st of October 1898, the serum was used during the epidemic and the recrudescence : the admissions were 663 with 186 recoveries or 28·05 per cent. the 53 convalescents being excluded. During the inter-epidemic months of November and December 1898 and January 1899, the serum was not used : the admissions were 273 with 51 recoveries or 18·68 per cent.

From the 1st of February to the 31st of May 1899 the serum was used again : the admissions were 930 with 201 recoveries or 21·61 per cent.

Thus the total recovery rate was *higher* in both periods in which the serum was used than in the period in which it was not employed, although considering the epidemiological conditions the *contrary* should have been the case.

That the higher total recovery rate at the Arthur Road Hospital was due to the serum treatment and not to other unknown influences, is directly proved by the fact that in 1898 as well as in 1899 the recovery rate rose immediately with the commencement of the treatment in spite of the synchronous rising of the epidemic.

The recovery rate at the Arthur Road Hospital was 22·19 per cent. in February 1898, rising to 24·89 per cent. in March, whereas at the Maratha Hospital the rate was 18·84 per cent. and 12·28 per cent. respectively. (In the City of Bombay, 4,750 attacks and 4,493 deaths have been recorded in February 1898, and 4,780 attacks and 4,969 deaths in March.)

A similar increase in the recovery rate following the introduction of the treatment was experienced in February 1899. In January of this year, 178 patients were admitted, of whom 29 recovered, the rate being 16·29 per cent. Although the number of admissions was 324 in February, indicating the rising epidemic, the recovery rate was 20·68 per cent. or 4·39 per cent. higher than in the previous month.

The Maratha Hospital, on the contrary, had 430 admissions in January 1899 with 85 recoveries, the rate being 19·76 per cent. or more than 3 per cent. higher than at the Arthur Road Hospital in January. It had 769 admissions with 127 recoveries in February, the rate being 16·51 per cent. or more than 4 lower per cent. than at the Arthur Road Hospital in the same month. In the City of Bombay 1,879 attacks and 1,591 deaths were recorded in January 1899, against 3,476 attacks and 3,038 deaths in February, the rate being 15·32 per cent. and 12·60 per cent. respectively.

The corresponding figures of the Modikhana Hospital could not be given, as the recovery rate for single months is worked out on a different basis, but there is no doubt that also there the rate followed the general course of the epidemic, which was at its worst in March 1898 and in February and March 1899.

I have nothing further to add to the above. Even the most sceptical will admit that the increase of the recovery rate at the Arthur Road Hospital in both years and just in the month of the beginning of the serum treatment, cannot have been accidental considering that the rate became lower everywhere else.

As might be expected, the influence of the serum treatment tended to show itself not only in the saving of life, but also in the prolongation of life in patients who eventually died.

The patients with the hopeful red L on their temperature charts—the sign of the serum treatment—lived distinctly longer than their less fortunate neighbours, who died with appalling rapidity.

If we look into the statistics for the expression of the prolongation of life, we find it in the reduction of the mortality within the first 48 hours after admission. Comparing the mortality within the first 48 hours after admission in the different periods of the years 1898 and 1899, the reduction due to the serum treatment is unmistakable. The following tables give the details:—

No. 1.

	NON-SERUM TREATMENT		SERUM TREATMENT.	
	1898. Jan. till 12th March, Nov. till Jan.	1899, January.	1898. 12th March till Nov.	1899. Feb. till June.
Admissions	14·71	178	663	930
Deaths within 48 hours ...	720	115	309	473
Percentage	48·94	64·60	46·60	50·86

No. 2.

					SERUM PERIOD. 12th March till 10th Nov. 1898 ; 1st Feb. till June, 1899.	INTERMEDIATE PERIOD. Nov. Dec. 1898. Jan. 1899.
Admissions	...	...	...	...	1,593	273
Deaths within 48 hours	...	...	...	...	782	156
Percentage	...	...	...	...	49.08	57.14

Most remarkable is the reduction in the mortality within 48 hours which took place from January to February 1899. It amounts to 14 per cent. and is fully established in February, the month of the beginning of the treatment with 324 admissions and 165 deaths within 48 hours. What was to be expected from an epidemic which in its initial stage had a mortality of 64 per cent. within 48 hours after admission, can probably be gathered from the records of other hospitals.

The prolongation of life is still more evident from the following table :—

		NON-SERUM CASES.		SERUM CASES.	
		Total.	Percentage.	Total.	Percentage.
Deaths within 48 hours	...	672	56.47	110	27.29
Deaths later on	...	285	23.94	139	34.49
Recoveries	...	233	19.57	154	38.21
Total	...	1,190	.....	403	.....

It is to be seen that the non-serum cases have only *double* the number of deaths later on, although their total number is *three times* larger than that of the serum cases.

It is further interesting to observe that in the non-serum cases the percentage is highest for the deaths within 48 hours, lower for the deaths later on, and lowest for the recoveries. In the serum cases just the opposite is the case. This corresponds with clinical observations.

In a certain number of patients the serum seems to have no effect whatever. They die within the first two days.

In a large number there is so decided an improvement after the first injections that recovery is hoped for. Then the patient gradually changes for the worse in spite of the continued treatment. It seems as if by the first injections the infection has been overcome ; but the patient dies in consequence of the irreparable degenerative changes which have already taken place.

In the largest number of patients in whom such changes are not established, the improvement after injection is followed by recovery.

As it has been said that the results of the serum treatment are not in conformity with the axiom of sero-therapeutics, "that the earlier the treatment the more favourable the prognosis"—an axiom which in this relation holds good for any kind of treatment—I shall analyse the distribution of the recoveries over the different days of illness on which the patients came in for treatment.

In this connection I should like to correct an error regarding this distribution which occurs in Capt. Childe's report, dated the 4th of April 1899, No. 226, to Surgeon-General G. Bainbridge, M.D., concerning 148 patients treated with Prof. Lustig's serum from February 2nd to March 27th. Capt. Childe gives on page 19 a table showing the number of patients treated on the different days of illness. According to this table, out of a total of 148 patients, 30 received treatment on the first day of illness. He states further, on page 20, para. 6, that 22 of them died, the mortality being 73·3 per cent. and demonstrates that, contrary to the axiom of sero-therapeutics, the mortality of the patients treated on the first day is *higher* than that of all the patients who underwent the treatment; the figures being 73·3 per cent. and 69·7 per cent. respectively, and continues by saying "that this points to the same conclusion, nameiy, that treatment by Prof. Lustig's serum has not much influence on the course of plague."

These statistics need rectification. By looking closer through Capt. Childe's report one will find that of the 30 patients admitted on the first day of disease 4 received the treatment on the day after admission, that is, on the *second* day of disease. On the first day there were therefore 26 patients treated, of whom 18 died and 8 recovered; the mortality being 69·2 per cent.

Hence the mortality of the patients who received treatment on the first day was *lower* than the mortality of all the patients who underwent the treatment; the figures being 69·2 per cent. and 69·7 per cent. respectively, instead of 73·3 per cent. and 69·7 per cent. as stated by Capt. Childe.

This error to consider the day of admission as identical with the day of the beginning of the treatment amounts to 11 for the patients admitted on the second day of illness and has vitiated the corresponding statistics and the conclusions drawn from them, which latter had in any case a very limited value indeed, based as they were on results which could be *materially* altered by an error of 4.

It is worth mentioning here that in Capt. Childe's report the Maratha Hospital shows 9 patients treated on the first day, in a total of 12, and the Arthur Road Hospital only 12 such patients in a total of 125.

After this necessary digression I return to my subject. The relation between recoveries and days of illness on which the treatment, commenced, is shown in the following table:—

Days of illness.	No. of patients treated.	Recoveries.	Percentage of recovery.
1st	37	14	37·8
2nd	140	49	35·
3rd	117	39	33·3
4th	54	26	48·1
5th	24	12	50·
6th	13	6	46·1
7th	18	8	44·4
	403	154	38·21

In remarking on the above it is surprising that so few patients received treatment on the first day of illness. The reason is that only about 6 per cent. of the admissions are patients in this early stage, at least at the Arthur Road Hospital. These patients are moreover mostly in a very bad condition. Their mortality is very high and many of them die soon after admission.

It is a serious disadvantage for the serum treatment in our plague hospitals that on the first day of disease when the chances of recovery are favourable so few patients are admitted.

The majority of patients were admitted to the hospital and received serum treatment on the second and third days of illness.

From the third day the number of treated decreases considerably, and this out of proportion to the number of admissions. This is due to the selection.

After the sixth day only 18 patients were treated, in all of whom protracted dangerous symptoms called for special intervention.

If we compare the percentage of recoveries on the different days without giving undue weight to this comparison, as the figures are small, we see that for the first three days the recovery rate corresponds to that axiom of serotherapy which has already been referred to. At first sight, in apparent contradiction to the above-mentioned axiom, is the higher recovery rate for the fourth and the following days. To understand this discrepancy, which has also been noted in the results of other plague sera, we have to remember that no treatment can *essentially* alter the curve of mortality of a particular disease. It can only keep it lower on the whole and modify it in certain phases, but the characteristic features must always remain. We can even perceive that in a single instance the recovery rate might be cent. per cent. higher in patients who came late to treatment, if this corresponds to the normal curve of mortality of a disease. We have, therefore, to see how the curve of mortality from plague runs normally.

If we put the time of incubation down to 10 days we may say that in the first days no deaths occur. In the later days of incubation deaths, no doubt, occur, but they are not always recognized as due to plague, evident symptoms being absent. With the eleventh day of infections or first day of illness manifest symptoms set in, the disease reaching its height in the majority of cases already on this day. The curve of mortality rises suddenly almost to its highest point, which is arrived at on the third or fourth day of illness. Then the mortality declines slowly to the sixth or seventh day, being somewhat *lower* on these days than it was on the first. The decline continues in moderate progression till the tenth day which can be looked upon as the end of the acute stage.

Patients in the incubation period are almost never to be found in hospitals, which is unfortunate, as in this period, or even in the first hours of the first day of illness, serum treatment can arrest and abort entirely the disease as was experienced in some cases.

The curve of mortality in hospitals begins therefore on the first day of illness and is higher than among patients treated outside, as only such patients are brought in who show very severe symptoms in the beginning. There is in fact little difference in hospitals between the mortality of the patients of the first or the third day, which latter shows the highest mortality. From the third day the mortality may deviate probably little from the general mortality. As has already been mentioned, the mortality in the serum cases follows the mortality in hospitals for the first three days, the mortality being highest on the third day. With the fourth day the mortality in the serum cases falls off considerably more than in the non-serum cases.

How can we explain that the serum is effective even at this later stage? Clinical observation gives the information.

Plague is characterized by attacks of three to four days' duration. The first attack is the most malignant one and carries away the most victims. Then there is a short

remission of symptoms indicated by a fall in the temperature so frequent on the third or fourth day. Patient and disease seem to gather strength for the final struggle.

At this stage, before the relapse comes on, the serum has proved useful; hence the quicker declining of the mortality on the fourth day. We have really a new first day of disease, and the patient who had resistance enough to survive the more dangerous first onslaught comes easier over the second one with the help of the serum, than with his own exhausted resources.

Were it not for this critical relapse the serum could not have any influence on the course of the disease after the third or fourth day, as it can only act against the infection and not against its established consequences.

The possibility of checking or mitigating the relapse is a most important and favourable feature of the treatment in Indian plague hospitals whither patients come usually too late for the treatment of the first attack.

We understand now why the rate of recovery in patients of the later days is cent. per cent. higher than in those of the earlier days. The absolute number of recoveries is naturally always higher among the more numerous admissions in the first days of illness.

I have tried to bring the results of the limited statistics available into harmony with the knowledge derived from the clinical observations of the disease and of the treatment, and I admit willingly that my deductions may have to be modified in the light of later experiences. Still the chief point in question, the efficacy of the serum treatment, even at a later stage, will remain untouched, however the connection of the facts may vary.

I have little more to say about the patients of the Arthur Road Hospital. The great majority of them were low-caste Hindu males who have generally a mortality 2·3 per cent. higher than Hindu females, so that also in this respect the serum was not favoured.

All ages were represented, the youngest child was four months, the eldest man 75 years. Forty children under 10 years had a recovery rate of 50 per cent. It can be said that they answer best to the serum treatment. Their mortality is in general the lowest.

In order to judge of the severity of the treated cases I attach copies* of the charts of temperature of the first 100 patients who recovered under the serum treatment as well as the corresponding ones of the patients who were under the ordinary treatment. They bear out fully what has been said about the selection of cases. No other clinical details are given than the curve of temperature during the acute stage, which may be taken as an approximate index of the course of the disease.

Certain charts have been signed on the right corner as "mild"; taking as criterion the shortness of the acute stage, the low temperature and the admissions on the later days. This classification has no scientific value and does not always correspond with the facts; it only facilitates comparison. Strictly speaking, such comparison is impossible as the mild course in many serum cases was brought about by the treatment.

* These copies only accompany the Commissioner's copy.

Still, as the charts are written with all the modifications due to the serum, there are only 27 charts that could be marked "mild;" whereas from the charts of the non-serum patients 54 had to be put down as "mild." Special attention is drawn to the chart No. 22 of a patient who came a few hours after the appearance of the first symptoms to the treatment. The curve of temperature under the influence of the serum suggests a mild attack; but, as a matter of fact, the case was a desperate one, with numerous plague bacilli in the blood.

Careful examination and comparison of the charts leave only two alternatives open: either the recoveries on the serum side have been obtained in patients who were on the average more gravely affected than the patients on the other side, or that the more severe course shown by the charts is due to the serum.

Although no less an authority than Dr. Ruffer, of the Indian Plague Commission, hinted that the high mortality at the Arthur Road Hospital—it was still higher at other hospitals—may be in causal connection with the application of the serum, I do not think it necessary to deal seriously with such an assertion. It is not only contradicted by all facts contradicted in this report, but also by all experience of the serum treatment in other diseases.

No curative serum has yet proved harmful as long as it was sterile and not used in doses in which blood serum in general may sometimes be injurious. The innocuousness guaranteed, the prejudice against the serum treatment seems very strange, and stranger still it seems that this prejudice is prevalent just amongst that part of the population which ought to know better and would eventually benefit the most by the treatment.

For completeness sake it may be mentioned that Lustig's serum has been tried in pneumonia, malaria, relapsing fever and streptococic infection in order to demonstrate its specific action. As was expected it showed neither good nor ill effects. It was further tried on healthy persons without causing the slightest inconvenience.

The patients treated outside the Arthur Road Hospital do not call for many remarks. Sixteen were treated in 1898 and 12 in 1899 at the Maratha Hospital. The recoveries were 8 and 3 respectively. The clinical notes show that the cases were, with few exceptions, of a very severe type, and that the Marathas seemed to answer better to the serum than to the patients of the Arthur Road Hospital.

Twelve patients were treated at the Parel Hospital in 1898 with the serum of horse No. 1, three of them recovering, eight patients who had been taken as control, all died.

Of more interest are 32 patients, treated in private practice, 19 of whom recovered. They were from the middle classes and of different nationalities. Some were hopeless and only treated at urgent request. Still the number of recoveries indicates clearly how much more effective the serum treatment is when applied under better conditions of life.

I pass now on to the clinical features of the serum treatment. Foremost in evidence is the antithermic action of the serum which is seldom wanting even in patients who in the end die. The increase of the arterial pressure and the improvement in the condition of the heart can be demonstrated by the sphygmograph. Delirium and headache very often subside considerably and the

patient becomes quiet and falls asleep. It is surprising how quick a dry tongue sometimes gets moist after one or two injections, even in patients who die later. The bubo does not increase in size and sometimes diminishes distinctly, becoming at the same time less tender and reabsorbing oftener than otherwise. The recovery is speedy and sequelæ appear seldom, if the patients come early for treatment. The first signs of the influence of the treatment show themselves usually within 12 hours after injection. A decided improvement in the general condition of the patients takes place in the majority of cases within 24 hours, and is naturally more pronounced in patients who recover.

Contra indications for the use of the serum do not exist. Still if a patient is sinking in collapse, it is wise to delay the injection, lest the antithermic effect may coincide with the collapse, and death, shortly after the beginning of the treatment, be attributed to the serum. In such cases, it is better to try to improve the heart's action by the use of stimulants. If the heart improves then the serum may still be useful : if the heart cannot be revived, then the serum is useless and is probably not absorbed quick enough to be effective.

It has always to be remembered that the serum influences symptoms only indirectly through acting upon the cause which has produced them. The exact mechanism of this action is not sufficiently known as yet. All that we can say at present is that recovery by curative as well as immunity by prophylactic treatment is due to a reaction in the body's tissues brought on by the respective agents. Sometimes without apparent reason no such reaction is produced ; then cure and prophylaxis fail.

The serum gives the best results as may be expected in the forms of plague in which recovery by nature is more frequent, *e.g.*, in uncomplicated bubonic plague.

Cases which show signs of septicæmia from the beginning can be cured, if the serum is used on the first day.

Mixed and secondary infections are unfavourable. The recent investigations of the Austrian and German Plague Commissions have shown that in a considerable number of patients, death is not directly due to plague, but to infection by various cocci. Plague, no doubt, paves the way for other micro-organisms which find a suitable soil in a body weakened by its action. Against the coccic infection, the plague serum, as a specific remedy, is without any effect. We can, therefore, appreciate still more the necessity of early treatment which, by checking the plague at its beginning, prevents the infection by other bacteria.

The frequency of such bacterial associations may vary in different epidemics of plague, as it is known to vary in other diseases in which such associations also occur, and they may have something to do with the malignity of certain epidemics and the non-typical course of single cases. In these mixed or secondary infections, a combined serum treatment may prove efficacious and is certainly worth trying.

Unfavourable also are complications with relapsing fever, or malaria, which were not infrequent in the patients at the Arthur Road Hospital.

No cures have been obtained in plague pneumonia. Comparatively few such cases have been treated, as pneumonia patients are mostly beyond help when they are admitted.

Symptomatic treatment is not to be neglected in serum cases. The patients at the Arthur Road Hospital received a small quantity of rum every two hours and cardiac stimulants when the heart showed signs of impending failure.

In order to facilitate a review of the facts relating to the efficacy of the serum that have been brought forward in this report, the following summary may be given :—

(a) *Clinical statement—*

1. Fall of temperature.
2. Increase of arterial pressure.
3. Mitigation of nervous symptoms.
4. Lessening of tenderness in the bubo.
5. Diminution of size of the bubo.
6. More frequent re-absorption of bubo.

(b) *Statistical statement—*

1. Varying efficacy of the different sera employed.
2. Higher recovery rate in the serum cases than in the non-serum cases.
3. Higher total recovery rate in the serum periods than in the intermediate period.
4. Increase of the monthly recovery rate coinciding in both serum periods with the commencement of the treatment.
5. Lower death-rate within the first 48 hours after admission during the serum period than during the intermediate period.
6. Higher total recovery rate at the Arthur Road Hospital during the time of the serum treatment than at other hospitals where the serum was not employed.

There is no missing link in this chain of proofs and the curative properties of Prof. Lustig's serum have, therefore, to be accepted as an established fact.

If I were to compress the conclusions to be drawn from this evidence in one sentence, I should say that "by Prof. Lustig's method a curative plague serum can be prepared which has shown in its experimental stage results which allow a hope that the serum will become an effective weapon in combating the disease."

Considering now the application of the remedy to a disease which attacks so numerous the poorest class of the population, one has to admit, hard as it is to admit it, that the *practical* value of the serum is in direct proportion to the percentage of recoveries which can be obtained under the unfavourable circumstances common to such a class of population. If this percentage falls under a certain standard, the cost of the preparation of the serum may be prohibitive.

Having ascertained by the clinical method, *that* the serum cures, it is all important therefore to ascertain, by an adequate method, which will be also convincing to the public at large, *how many* it cures. The treatment with the serum is therefore being continued at the Arthur Road Hospital, every alternative case being subjected to it.

No fundamental objection can be raised now against statistics as the experimental stage of the treatment is past. Variations on the preparation or application which may still have to be adopted, will serve as improvements only. Such improvements are already under contemplation. They have not been attempted until

now as, owing to the small number of the horses, a good method could not be abandoned for a possibly better one as long as the efficacy of the serum was not universally acknowledged.

After all that has been said about the errors of statistics, it is hardly necessary to repeat that the number of observations must be large. If I should be called upon to fix this number, I should say that at least 500 comparable observations will be necessary in order to allow reliable statistical conclusions. But if the observations are made under the varying conditions of different surroundings or by persons, not familiar with the treatment, new unknown factors are introduced and the number of observations has to be still further increased. It is for this reason that the experimenters are as yet reluctant to have the observations scattered over different places, the supply of serum being still limited.

The issue at stake is of such great importance that every step forward has to be taken with the utmost precautions in order to avoid accidental non-successes. These remarks may also be applied to the use of the serum in private practice where the indiscriminate administration of the serum may discredit it in single instances. This disadvantage, however, will be greatly counterbalanced by the favourable conditions of application, and we may expect from private practitioners early accounts of good results.

What are the *best* results we may hope for in hospitals?

Provided future epidemics are not of increased virulence, the percentage of recoveries ought to be higher than it was in the selected cases. Firstly, because the results of the past have been obtained in patients who, owing to the selection, would have had an increased mortality under the ordinary treatment, and secondly, because we may expect that sooner or later the production of a serum of the highest activity will be the rule.

The efficacy of a serum must not be judged by the *average* results which have been obtained, but by the *best* results. If a serum with high curative properties has once been prepared, it will be possible to prepare it *again*, and with certainty. This is merely a question of time and experience.

Considered numerically, it may be said that about 30 per cent. of the patients at the large plague hospitals die within the first 24 hours after admission, and that recovery in them will be exceptional even with the best serum. Within the next 24 hours another 20 per cent. die: that many of these may be saved is open to doubt. About 20 per cent. recover under the ordinary treatment. Thus there remain 30 per cent. in which there is the *possibility* and *probability* of the serum influencing recovery.

An increase of the recovery rate from 20 per cent. to 50 per cent. is what we can confidently hope for.

It can be said that this does not correspond to 26 recoveries in 30 cases treated by Prof. Lustig in 1897. To this I would reply, that a generalisation from the lower to the higher number is in itself erroneous, that the average recovery rate in 1897 was 15 per cent. to 20 per cent. higher than it is now, and that the treated patients were mostly Mahomedans or soldiers of good physique, well fed and brought early to the hospital—all the above conditions being favourable to the serum treatment.

That by the serum treatment a mortality of 80 per cent. should be reduced to an insignificant number, as some demanded, is an exaggeration which could only have been indulged in by those who were ignorant of the clinical features of plague.

In private practice a higher recovery rate will be obtained.

If the above estimated benefit is approximately correct, would the increase of the recovery rate from plague by 30 per cent. constitute the practical value of the serum and would the cost allow of its preparation on a corresponding scale?

When the serum treatment was begun in Bombay, the public interest was concerned with Prof. Haffkine's prophylactic, the method of which is *wholesale application*. By an unconscious mental process which was facilitated by the still existing confusion between the names, the requirements of the one were applied to the other, although they differ *essentially*.

The prophylactic treatment is confronted with the ubiquitous possibility of infection and must, therefore, be wholesale in order to be effective.

Quite different are the requirements of a curative treatment. Its object is the sick, and its aim recovery, which latter is the direct proof of the efficacy: but as recovery is not possible in every case, a curative treatment is always *selective* and ought to be confined to those who can be influenced by it. Such selection is feasible in plague as very often the possibility of recovery is absolutely excluded. It is also necessary as without selection the preparation of a sufficient quantity of serum would be difficult and the cost considerably increased. The question therefore stands thus:—

Shall we *cure none* because we cannot *treat all*?

There should be only one answer to this question. But whatever the answer may be, and whatever the future of the serum treatment of plague here in India, the knowledge that there is a remedy for those sick of the pestilence will be of value to mankind, while the merit of having been instrumental in the acquisition of this knowledge will always remain with the Bombay Municipality and their advisers, Col. Weir and the late Commissioner Mr. Snow, who were active in initiating the serum treatment.

APPENDIX No. III.

REPORT ON THE TREATMENT OF PLAGUE

BY

DR. GALLEOTTI'S CURATIVE SERUM

BY

CAPTAIN L. F. CHILDE, I.M.S.

Statement of Plague Cases treated by Dr. Galleotti's Serum at Marátha Plague Hospital.

No.	Name.	Date of Admission.	Age.	Sex.	Caste.	Day of Disease.	Date of Serum injected.	AMOUNT OF SERUM INJECTED.												Result.	REMARKS.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
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1	Narbada Laximan	2nd February 1899	18	Female.	Hindu	2 days	3rd February 1899.	18	15	15	15	15	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19</

Statement of Plague Cases treated by Dr. Galleotti's Serum, at the Arthur Road Hospital.

No.	Name.	Date of Admission.	Age.	Sex.	Caste.	Date of Disease.	Date of Serum injected.	AMOUNT OF SERUM INJECTED.												Result.	REMARKS.
								1st day.		2nd day.		3rd day.		4th day.		5th day.		6th day.			
								Morning.	Evening.	Morning.	Evening.	Morning.	Evening.	Morning.	Evening.	Morning.	Evening.	Morning.	Evening.		
12	Girza Babu...	29th January 1899.	10	Child	Hindu	2 days	29th January 1899.	c. c.	c. c.	c. c.	c. c.	c. c.	c. c.	c. c.	c. c.	c. c.	c. c.	c. c.	c. c.	Died 3-15 P.M., 31st Temp. 106-4.	
13	J. J. DeSilva	28th do.	61	Male	Christian...	4 "	30th do.	20	...	...	...	...	...	...	...	...	...	...	...	January 1899.
14	Unknown	31st do.	42	Do.	Hindu	1 day	31st do.	...	15	...	15	...	15	...	...	...	...	...	...	Died 2-15 A.M., 31st
15	Rama Raghu	1st February 1899.	20	Do.	Do.	4 days	1st February 1899.	15	15	10	10	10	10	...	10	20	15	20	...	January 1899.	
16	Bhambu Raju	1st do.	20	Do.	Do.	4 "	1st do.	15	...	15	...	...	...	...	...	...	...	...	...	Died 12 o'clock, 1st Moribund.
17	Mahadu Ithu	31st January 1899.	10	Child	Do.	4 "	1st do.	10	10	5	5	5	10	10	10	5	5	5	5	February 1899.	
18	Shiva Issu	1st February 1899.	40	Male	Do.	2 "	1st do.	...	15	15	15	15	15	10	15	...	15	15	15	Recovered ...	
19	Ganesh Khedu	1st do.	38	Do.	Do.	2 "	1st do.	...	15	10	15	15	15	...	...	...	...	...	...	Died 10 P.M., 1st Moribund.
20	Biranji Ganesh	1st do.	25	Female	Do.	3 "	1st do.	...	15	...	10	15	15	20	20	...	...	...	...	February 1899.
21	Deuba Gainu	2nd do.	18	Male	Do.	3 "	2nd do.	15	...	15	10	...	...	...	...	...	...	...	...	Died 7 A.M., 4th Improvement and then relapse.
22	Esu Kondaji	1st do.	30	Do.	Do.	5 "	2nd do.	...	15	...	...	...	...	...	...	...	...	...	...	Died 6-50 P.M., 4th Meningeal symptoms and Hematemesis.
23	Gannu Gosai	2nd do.	29	Do	Do.	3 "	2nd do.	...	15	...	...	...	...	...	...	...	...	...	...	Died 9 P.M., 3rd Multiple buboes.
24	Pandu Gopal	2nd do.	15	Do.	Do.	1 day	2nd do.	...	15	18	10	15	15	...	...	...	...	...	...	February 1899.
25	Shiva Hari	4th do.	30	Do.	Do.	4 days	4th do.	...	15	15	15	15	15	...	...	...	...	...	...	Died 7 P.M., 3rd Moribund.
26								...	15	...	...	...	...	...	...	...	...	...	...	Died 12-15 P.M., 3rd Moribund.
27								...	15	...	...	...	...	...	...	...	...	...	...	February 1899.
28								...	15	18	10	15	15	...	...	...	...	...	...	Died 8 A.M., 5th Semi-conscious on admission.
29								...	15	15	15	15	15	...	...	...	...	...	...	February 1899.
30								...	15	15	15	15	15	...	...	...	...	...	...	Died 9-15 P.M., 6th Died of heart failure.

No.	Name.	Date of Admission.	Age.	Sex.	Caste.	Date of Disease.	Date of Serum injected.	AMOUNT OF SERUM INJECTED.												Result.	REMARKS
								1st day.		2nd day.		3rd day.		4th day.		5th day.		6th day.			
								Morning.	Evening.	Morning.	Evening.	Morning.	Evening.	Morning.	Evening.	Morning.	Evening.	Morning.	Evening.		
26	Abba Bala	4th February 1899.	32	Male	Hindu	7 days	4th February 1899.	c.c.	c.c.	c.c.	c.c.	c.c.	c.c.	c.c.	c.c.	c.c.	c.c.	c.c.	c.c.	Died 6.30 P.M., 13th February 1899.	Improvement and then relapse.
27	Govind Hiru	6th do.	25	Do.	Do.	3 "	6th do.	...	20	15	20	20	20	20	...	...	...	...	...	Died 9 P.M., 8th February 1899.	Very delirious and feeble pulse.
28	Maruthi Jiwha	3rd do.	25	Do.	Do.	6 "	3rd do.	10	10	...	...	...	...	...	...	...	...	...	...	Died 10 P.M., 6th February 1899.	Tetanic. Injection stopped.
29	Jani Bhawu	2nd do.	20	Female	Do.	3 "	3rd do.	15	...	...	...	...	...	...	...	...	...	...	...	Died 12.50 noon, 3rd February 1899.	Moribund.
30	Ramehander Nana.	8th do.	22	Male	Do.	4 "	8th do.	...	20	20	20	20	15	15	15	15	...	...	...	Died 21st February 1899.	Death from oedema of lungs.
31	I. M. Fernandes	3rd do.	18	Female	Christian.	2 "	3rd do.	15	15	15	15	10	10	10	...	...	...	...	...	Recovered	
32	Dama Lemba	3rd do.	28	Male	Hindu	4 "	3rd do.	...	15	15	...	...	...	...	...	...	...	...	...	Died 10.15 A.M., 5th February 1899.	Unconscious.
33	Marauti Santu	3rd do.	35	Do.	Do.	4 "	3rd do.	...	15	10	10	15	20	20	20	...	...	...	...	Died 10 A.M., 7th February 1899.	Do.
34	Sambu Ganu	4th do.	2½	Child	Do.	3 "	4th do.	5	...	...	...	...	...	...	...	...	...	...	...	Died 6.45 A.M., 5th February 1899.	Sudden failure of heart.
35	Jumnabye Dulbi	4th do.	6	Do.	Do.	2 "	4th do.	10	...	10	10	...	...	...	...	...	...	...	...	Died 8.30 P.M., 6th February 1899.	Convulsions and oedema of lungs.
36	Tribhawan Govind...	3rd do.	18	Male	Do.	2 "	3rd do.	...	15	15	15	10	15	10	10	10	10	...	...	Recovered.	
37	Soma Mitha	5th do.	15	Do.	Do.	1 day	5th do.	20	20	20	20	15	15	...	20	10	10	10	...	Do.	
38	Shivram Bhau	5th do.	12	Do.	Do.	2 days	5th do.	15	15	15	...	...	...	...	...	...	...	...	...	Died 3.55, 7th February 1899.	Sudden failure of the heart.
39	Dagru Janu	7th do.	10	Child	Do.	1 day	7th do.	...	20	20	20	...	...	...	...	...	...	...	...	Died 3 A.M., 8th February 1899.	Heart failure.
40	Dhondu Bhairu	7th do.	30	Male	Do.	3 days	7th do.	...	20	20	20	15	15	20	20	15	...	...	...	Died 9.30 P.M., 17th February 1899.	Died of exhaustion.
41	Jai Tukaram	7th do.	50	Female	Do.	4 "	7th do.	...	20	20	20	15	...	...	...	...	...	...	...	Died 7.30 P.M., 6th February 1899.	

42	Salvador Noronka ...	2nd	5th	do.	...	40	Male ...	Christian...	3	"	...	5th	do.	...	20	20	20	20	20	10	...	10	10	...	10	...	Died 23rd February 1899.	Died of exhaustion from sloughing of iliac bubo.	
43	Bahu Laku ...	...	3rd	8th	do.	...	18	Do. ...	Hindu	...	1 day	...	8th	do.	...	20	...	...	...	...	...	...	...	...	...	...	Died 6-15 P.M., 8th February 1899.	Moribund.
44	Pira Bapuji...	...	do.	7th	do.	...	20	Female	Do.	...	2 days	...	7th	do.	20	15	...	15	15	15	15	15	15	15	...	Recovered.	
45	Bhawansing Rysing.	do.	8th	do.	do.	...	12	Male ...	Do.	...	2	"	...	9th	do.	...	...	15	...	10	10	10	10	10	...	Do.		
46	Dhondur Raghur	...	do.	8th	do.	...	19	Do. ...	Do.	...	4	"	...	9th	do.	...	...	20	...	15	20	15	20	15	10	10	Do.	
47	Conci Babul	...	do.	10th	do.	...	12	Female	Do.	...	1 day	...	11th	do.	...	...	20	20	20	20	20	20	20	20	...	Died 7-20 A.M., 14th February 1899.		
48	Shamji Pitamber	do.	13th	do.	do.	...	40	Male ...	Do.	...	3 days	...	13th	do.	...	...	20	...	...	...	...	...	...	...	...	...	Died 5 P.M., 13th February 1899.	Sudden failure of heart.
49	R. M. DeSilva	...	do.	9th	do.	...	22	Female	Christian	...	2	"	...	11th	do.	...	20	Recovered.		
50	Jiji Khandu	...	do.	14th	do.	...	12	Do. ...	Hindu	...	3	"	...	15th	do.	...	20	20	15	20	7	...	...	...	...	Do.		
51	Dhondur Succaram...	do.	13th	do.	do.	...	25	Male ...	Do.	...	3	"	...	13th	do.	...	...	20	20	20	10	...	15	20	20	...	Died 1 A.M., 18th February 1899.	From oedema of lungs.
52	Mr. M. (Private)	do.	9th	do.	do.	...	25	Do. ...	Parsi	...	2	"	...	10th	do.	...	20	20	Recovered.		
53	Chemi Bapu do.	do.	13th	do.	do.	...	40	Female	Hindu	...	1 day	...	13th	do.	20	20	20	10	Died 5-30 P.M., 15th February 1899.		
54	Miss P. (Private)	...	1st	30th	January 1899	...	16	Do. ...	Parsi	...	2 days	...	30th	January 1899	...	15	15	15	15	15	10	5	5	Recovered.		
55	Mr. K. do.	...	3rd	11th	February 1899.	...	46	Do. ...	Do.	...	4	"	...	11th	February 1899	...	20	...	...	...	...	...	...	...	...	...	Died 2 A.M., 12th February 1899.	Had a relapse with iliac bubo.
56	Miss K. do.	...	do.	11th	do.	...	16	Do. ...	Do.	...	1 day	...	11th	do.	...	...	20	18	...	...	...	...	...	...	...	...	Recovered.	Mitral Regurgitation and Diabetes.
57	Joda Harsajal	...	4th	21st	do.	...	40	Male ...	Hindu	...	4 days	...	21st	do.	...	...	20	...	...	...	...	...	...	...	...	...	Died 9 A.M., 21st February 1899.	Moribund.
58	Jiwa Kalu ...	...	do.	31st	do.	...	18	Do. ...	Do.	...	2	"	...	21st	do.	...	...	20	...	...	...	...	...	...	...	...	Died 4 P.M., 22nd February 1899.	Heart failure.
59	Parbu Narsu	...	do.	21st	do.	...	30	Do. ...	Do.	...	3	"	...	21st	do.	...	...	20	20	...	...	...	...	...	...	...	Died 7-55 P.M., 22nd February 1899.	Secondary Pneumonia.
60	Hiralal Lon	...	do.	21st	do.	...	35	Do. ...	Do.	...	3	"	...	21st	do.	...	...	20	20	20	20	20	20	20	20	...	Died 4 P.M., 3rd March 1899.	Do.
61	Nama Rama	...	do.	24th	do.	...	35	Do. ...	Do.	...	2	"	...	24th	do.	...	20	20	20	20	20	20	20	20	Died 6 P.M., 27th February 1899.		
62	Ganu Chandria	...	do.	23rd	do.	...	22	Do. ...	Do.	...	2	"	...	24th	do.	...	30	30	20	20	20	20	20	20	Died 10 A.M., 27th February 1899.		
63	Gavaram Bholla ...	do.	24th	do.	do.	...	50	Do. ...	Do.	...	2	"	...	24th	do.	...	20	20	20	20	20	20	20	20	Died 7-15, 28th February 1899.		

No.	Name.	Date of Admission.	Age.	Sex.	Caste.	Day of Disease.	Date of Serum injected.	AMOUNT OF SERUM INJECTED.												Result.	REMARKS.
								1st day.		2nd day.		3rd day.		4th day.		5th day.		6th day.			
								Morning.	Evening.	Morning.	Evening.	Morning.	Evening.	Morning.	Evening.	Morning.	Evening.	Morning.	Evening.		
64	Shanker Suka	... 4th 24th February 1899.	5	Child...	Hindu ...	2 days ...	24th February 1899.	c. c. c.	c. c. c.	c. c. c.	c. c. c.	c. c. c.	c. c. c.	c. c. c.	c. c. c.	c. c. c.	c. c. c.	Recovered.			
65	Raghu Krishna	... do. 24th do.	32	Male ...	Do. ...	3 "	24th do.	...	...	20	20	20	20	...	...	...	...	Died 12-30, 26th February 1899.	
66	Succaram Bapu	... do. 25th do.	18	Do. ...	Do. ...	2 "	25th do.	...	...	20	20	...	...	...	...	...	...	Do.	
67	Dhondu Vithu	... do. 26th do.	12	Do. ...	Do. ...	3 "	26th do.	15	...	...	...	...	...	...	...	...	...	Died 3-30 P.M., 26th February 1899.	Moribund.
68	Ganput Yessu	... do. 25th do.	23	Do. ...	Do. ...	2 "	26th do.	20	...	...	...	...	...	...	...	...	...	Died 5-30 P.M., 26th February 1899.	
69	Babukhan Husain	... 5th 24th do.	18	Do. ...	Mussalman	2 "	23rd do.	...	...	20	20	15	20	15	15	...	...	Died 9-15 A.M., 2nd March 1899.	Secondary Pneumonia.
70	Rama Dargu	... do. 26th do.	25	Do. ...	Hindu ...	2 "	26th do.	...	...	20	20	10	...	...	...	...	...	Died 8-30 P.M., 27th February 1899.	Heart failure, septic type.
71	Bhau Babaji	... do. 26th do.	19	Do. ...	Do. ...	2 "	26th do.	...	...	20	20	20	15	10	...	20	15	Died 3-45 A.M., 3rd March 1899.	Do.
72	Reva Begla	... do. 26th do.	30	Do. ...	Do. ...	2 "	26th do.	...	...	20	20	15	10	15	...	...	...	Died 8 P.M., 28th February 1899.	Edema of lung.
73	Mahadu Tann	... do. 27th do.	27	Do. ...	Do. ...	3 "	27th do.	...	...	30	30	20	20	20	15	...	...	Recovered.	
74	Yedu Rama	... do. 26th do.	6	Child...	Do. ...	3 "	28th do.	10	10	5	...	...	...	...	...	...	...	Do.	
75	Sawalia Dhondi	... do. 2nd March 1899...	12	Male ...	Do. ...	5 "	2nd March 1899	15	15	10	...	...	...	...	...	...	...	Do.	A mixed case of plague and remittent fever.
76	Kondiba Maroti	... do. 5th do.	20	Female.	Do. ...	2 "	5th do.	20	...	...	...	...	...	...	...	...	...	Died 7 P.M., 5th March 1899.	Heart failure.
77	Walji Tricum	... do. 5th do.	10	Child...	Do. ...	"	5th do.	10	10	5	...	...	...	...	...	...	...	Died 3-40 A.M., 7th March 1899.	Do.
78	Tricum Purshotam	... do. 5th do.	30	Male ...	Do. ...	3 "	5th do.	20	20	10	...	...	...	...	...	...	...	Died, 16th March 1899.	Marasma and exhaustion.

[illegible]

No.	Name.	Date of admission.	Age.	Sex.	Caste.	Day of Disease.	Date of Serum injected.	AMOUNT OF SERUM INJECTED.												Result.	REMARKS.	
								1st day.		2nd day.		3rd day.		4th day.		5th day.		6th day.				
								Morning.	Evening.	Morning.	Evening.	Morning.	Evening.	Morning.	Evening.	Morning.	Evening.	Morning.	Evening.			
101 ¹⁴	Dadu Sadu	11th March 1899	30	Male	Hindu	3 days	12th March 1899	...	c.	c.	c.	c.	c.	c.	c.	c.	c.	c.	c.	...	Died, 15th March 1899.	Secondary Pneumonia.
102 ¹⁵	L. C. Sequeira	do.	45	Do.	Christian	3 "	do.	...	...	20	10	...	10	15	15	...	...	...	...	...	Do.	Fatty heart and do.
103 ¹⁶	Pandu Janu	do.	20	Do.	Hindu	2 "	do.	...	20	15	15	15	15	15	...	...	...	...	...	...	Recovered.	
104 ¹⁷	Kessu Lalla	do.	60	Do.	Do.	2 "	do.	...	15	15	15	15	10	10	...	...	...	...	...	...	Died, 23rd March 1899.	From exhaustion after 11 days.
105 ¹⁷	Bhawanisunker Hary	do.	17	Do.	Do.	2 "	do.	...	15	15	10	...	...	...	...	...	...	...	...	...	Recovered.	
106 ¹⁹	Nana Bhana	do.	25	Do.	Do.	2 "	do.	...	...	20	20	20	...	...	...	...	...	...	...	...	Died, 15th March 1899.	Heart failure.
107 ²⁰	Francis X. Fernandes	do.	20	Do.	Christian	3 "	do.	...	20	20	20	15	10	...	...	...	...	...	...	...	Recovered.	
108 ²¹	Gunia Sudu	do.	35	Do.	Hindu	4 "	do.	...	20	15	15	15	10	...	...	...	...	...	...	...	Do.	
109 ²¹	Apa Bhaukhan	do.	20	Do.	Do.	2 "	do.	...	...	20	10	10	16	...	...	...	...	...	...	...	Do.	
110 ²²	Sheva Khondaji	do.	35	Do.	Do.	2 "	do.	...	...	20	20	20	15	20	20	15	20	...	...	...	Do.	
111 ²³	Ciprion Fernandes	do.	25	Do.	Christian	2 "	do.	...	...	20	10	...	...	...	...	...	...	...	...	...	Died, 15th March 1899.	Moribund.
112 ²⁴	John DeCosta	do.	30	Do.	Do.	3 "	do.	...	20	20	...	...	...	...	...	...	...	...	...	...	Died, 16th March 1899.	Secondary Pneumonia and heart failure.
113 ²⁵	Sukai Iahari	do.	30	Do.	Hindu	4 "	do.	...	20	20	...	...	...	...	...	...	...	...	...	...	Recovered.	
114 ²⁶	Deria Isra	do.	23	Do.	Do.	5 "	do.	...	...	20	10	10	...	...	...	...	...	...	...	...	Died, 17th March 1899.	Heart failure.
115 ²⁷	Mamiaji Yesram	do.	15	Do.	Do.	3 "	do.	...	20	20	...	...	...	...	...	...	...	...	...	...
116 ²⁸																						

No.	Name	Age	Sex	Religion	Duration of Illness	Onset	Temperature	Pulse	Respiration	Stool	Urine	Diagnosis	Prognosis	Remarks
116	Cyprian Alphonso	15th	do.	...	1 day	...16th	do.	...	20	10	10	10	10	...
117	Private do.	27th	February 1899	...	4 days	...	.....	70	c.c.	...	...	...	...	...
118	Mrs. H. S. ...Private do.	15th	March 1899	...	3 "	...15th	March 1899	...	57	c.c.	...	...	...	...
119	Bhagvandas Raghu	16th	do.	...	4 "	...16th	do.	...	...	10	10	10	10	...
120	Domingo Caitan	16th	do.	...	1 day	...16th	do.	...	...	20	15	10	10	...
121	Krishna Vithu	17th	do.	...	3 days	...17th	do.	...	20	20	15	15	...	...
122	Cosme Damian	17th	do.	...	3 "	...17th	do.	...	30	20	20	15	20	...
123	Walla Prema	17th	do.	...	4 "	...17th	do.	...	...	20	15	10	10	...
124	Gandaram Karamchand	16th	do.	...	4 "	...17th	do.	...	...	20	15	10	10	...
125	Mrs. Moses	17th	do.	...	4 "	...17th	do.	...	...	20	15	10	10	...
126	Babaji Zora	17th	do.	...	4 "	...17th	do.	...	...	20	20	10	5	...
127	Peter Fernandes	18th	do.	...	3 "	...18th	do.	...	15	10	10	15	10	...
128	Maruti Gainu	18th	do.	...	3 "	...18th	do.	...	20	10	10	...	...	...
129	Miss B. I. S. Private do.	17th	do.	...	3 "	...18th	do.	...	20	15	15	15	5	...
130	Savatie Saurela	18th	do.	...	2 "	...17th	do.	...	50	c.c.	...	...	...	...
131	Francis Pereira	18th	do.	...	2 "	...18th	do.	...	...	20	15	20	...	...
132	Antone Salvador	18th	do.	...	1 day	...18th	do.	...	...	20	15	...	...	...
133	Shaikh Madar	18th	do.	...	3 days	...18th	do.	...	...	15	20	...	...	...
134	Pedro Bustaw De Costa	18th	do.	...	3 "	...18th	do.	...	...	15	15	...	...	...
135	Piran Amer	16th	do.	...	1 day	...18th	do.	...	...	15	20	15	10	...
136	Salva Mahado	18th	do.	...	2 days	...16th	do.	...	...	30	20	20	15	...
137	Dhondu Krishna	19th	do.	...	1 day	...18th	do.	...	...	30	20	...	...	...
138	Dhondu Krishna	19th	do.	...	3 days	...19th	do.	...	20	10	10	10	5	...

Observations.—The total number of cases treated by Dr. Galleotti's serum from February 2nd to March 27th has been 148 ; of which 125 were treated at the Arthur Road Hospital, 12 were treated at the Maratha Hospital, and 11 were treated in their own houses.

By sex, these 148 persons consisted of 118 males and 30 females (11 being children) ; and

By caste, there were 117 Hindus, 18 Native Christians, 9 Pársis and 4 Máhomedans.

With regard to duration of disease, it is found that—

30 were treated on the 1st day of disease.			
49	do.	2nd	do.
43	do.	3rd	do.
20	do.	4th	do.
4	do.	5th	do.
1	was	6th	do.
1	do.	7th	do.
<hr/> 148 <hr/>			

so that 122 out of 148 patients were receiving the serum treatment on or before the 3rd day of plague.

Mortality.—Of the total 148 cases, 99 died, 43 recovered, and 6 are still under treatment.

Out of the 113 adult males, 78 died, 29 recovered, and 6 are under treatment.

Of the 24 adult females, 14 died, 10 recovered.

Of the 11 children, 7 died, 4 recovered.

Mortality by Caste.—Of the 117 Hindus, 80 died, 31 recovered, and 6 are under treatment.

Of the 18 Native Christians, 12 died, 6 recovered.

Of the 9 Pársis, 4 died, 5 recovered.

Of the 4 Máhomedans, 3 died, 1 recovered.

Percentage Mortality.—Of all the cases, the percentage of deaths to recoveries is 66·9, but if the 6 cases under treatment be excluded, the percentage mortality is 69·7.

By Sex.—Of the 113 adult males, the mortality is 69·1 per cent., but excluding the 6 cases under treatment, it amounts to 72·9 per cent.

Of the 24 adult females, the mortality is 58·3 per cent.

Of the 11 children, the mortality is 63·6 per cent.

By caste, the mortality is as follows :—

Hindus ...	...	...	...	...	68·4 per cent.
Máhomedans ...	...	...	...	...	75 do.
Native Christians ...	...	...	...	...	66·7 do.
Pársis ...	...	...	...	...	44·4 do.

(1) *General Remarks.*—Selection of cases for treatment. In this enquiry an endeavour was made to confine the treatment to cases of average severity, that is to those who, on admission, seemed to have a reasonable chance of recovery ; so that two classes of patients did not receive the serum, namely, those who were obviously moribund, and those whose symptoms were mild, and who were likely to recover, irrespective of treatment. It must be admitted that it is difficult to make a prognosis in any case of plague, as the most unexpected results occur ; still, as far as could be judged from the symptoms on admission to hospital, the above selection of cases was made.

(2) *Treatment in addition to the serum.*—In all cases at the Arthur Road Hospital a stimulant (rum) was given every two hours ; and in cases showing symptoms of heart-failure cardiac tonics were also administered, such as digitalis, strychnine, strophanthus, caffeine.

(3) *Causes of death.*—These were sudden heart-failure, secondary pneumonia, bronchitis, œdema of the lungs, hæmorrhage, or exhaustion ; in fact death was due to the same causes as in plague-patients not treated by the serum.

(4) *Effects of the serum treatment.*—In many cases the temperature fell 1 or 2 degrees shortly after the injection of serum, and with this fall there was a corresponding improvement in the patient's general condition ; but this improvement was often only temporary, and would be observed after each subsequent injection ; still in those patients who died, the general course of the disease was steadily from bad to worse, and their symptoms were practically identical with those of plague-patients treated in other ways.

(5) *General conclusions.*—From the evidence of this enquiry it cannot be said that Dr. Galleotti's serum-treatment of plague shows any marked curative results ; for of the 142 completed cases the mortality is 69·7 per cent., and the general death-rate of plague-patients treated in a hospital is only a little higher. I am informed that this rate is 80 per cent., but have no means of verifying the statement ; still accepting this figure as correct, the most that can be claimed for Dr. Galleotti's treatment is a 10 per cent. reduction in mortality.

(6) *Evidence of early cases.*—Of the 148 cases, 30 received the serum-treatment on the first day of disease ; and of these 30, 22 died and 8 recovered, so that in this series the death-rate was 73·3 per cent. Now it is an axiom in serum-therapeutics that the earlier the treatment, the more favourable the prognosis ; yet in this instance we find that the mortality of the patients treated on the first day is higher than that of all the patients who underwent the treatment ; the respective figures being 73·3 and 69·7 per cent. This fact points to the same conclusion, namely, that treatment by Dr. Galleotti's serum has not much influence on the course of plague.

L. F. CHILDE, M.B., Captain, I. M. S.,
Acting First Physician, Sir J. J. Hospital.

Extract from the Report by the Extra Assistant Health Officer, Arthur Road Hospital, dated 3rd May 1899.

SIR,

I have the honour to submit herewith the following report and return of cases treated with Professor Lustig's serum during April 1899 :—

The number of cases treated was 39, of whom 21 died and 18 recovered, giving a mortality rate of 53·84 per cent. The mortality rate of cases not similarly treated was 77·51 per cent., thus showing a difference of 23·67 per cent. in favour of the former.

2. The cases were divided into the following series :—

Series.				Horse Number.	Bleeding.	Number Treated.	Number Died.	Number Recovered.
VIII (completed)	...	...	...	5	Second.	16	10	6
IX	...	...	...	Donkey.	First.	2	1	1
X	...	...	...		Second.	14	7	7
XI (to be continued)	...	...	...	1	Do.	7	3	4
Total				.....	.....	39	21	18

3. From a comparison of the returns for February, March and April it appears that each succeeding month the serum shows better results as it becomes stronger and more active. And considering that the present epidemic did not show any marked decline till about the middle of April, and that the individual cases do not even yet show any marked diminution in their virulence, in spite of the fact that the epidemic is steadily declining, the results so far achieved should be considered satisfactory. This is better illustrated by the following table which compares the results during the period :—

Months.					Mortality rate of cases not treated with the serum.	Mortality rate of cases treated with the serum.	Difference in favour of serum cases.
1899.							
February	...	...	...	...	79.16	79.58	8.58
March...	...	...	...	...	79.48	66.21	13.27
April ...	...	...	...	...	77.51	53.84	23.67

The above table shows that whereas the mortality rate has varied very little amongst the cases not treated with the serum, it shows a very appreciable improvement in those treated with it, and the improvement has steadily bettered from 8.58 per cent. to 23.67 per cent., a difference of over 15 per cent.

4. When all the series of cases are compared, two points are clearly brought out, *viz.*: (1) that the serum obtained from the second bleedings is more active than from the first, and (2) that the serum from the different horses shows different degrees of activity :—

Series.					Horse Number.	Bleeding.	Number treated.	Number died.	Number recovered.
I	...	...	...	...	5	First.	18	14	4
II	...	...	...	...	2	Do.	11	8	3
III	...	...	...	...	3	Do.	17	10	7
IV	...	...	...	...	2	Do.	13	11	2
V	...	...	...	...	1	Do.	17	12	5
VI	...	...	...	...	4	Do.	47	30	17
VII	...	...	...	...	6	Do.	13	8	5
VIII	...	...	...	...	5	Second.	22	14	8
IX	...	...	...	...	Donkey.	First.	2	1	1
X	...	...	...	...		Second.	14	7	7
XI	...	...	...	...		Do.	7	3	4
Total	...	...	...	...	...	...	181	118	63

The above statement indicates that the results from the first and second bleedings were 68.38 per cent. and 55.81 per cent., respectively, thus clearly showing a difference in greater activity of 12.57 per cent. from the latter, and as the serum gets stronger at each subsequent bleeding, it is to be expected that better results would be shown in the near future. The serum supplied from Florence last year also showed similar variations between the first and second bleedings.

The table further demonstrates that different horses give serums of different activities, and this also materially corroborates the experiences of last year when it was observed that the different horses under experiment at Florence gave serums of different curative values.

No. 4816 of 1899.

From

THE SURGEON-GENERAL WITH THE
GOVERNMENT OF BOMBAY ;

To

THE SECRETARY TO GOVERNMENT,
General Department (Plague),
Bombay.
*Office of the Surgeon-General with the
Government of Bombay, Town Hall,
Bombay, 29th May 1899.*

SIR,

With reference to your No. 2902-P., dated 28th ultimo, I have the honour to submit the following observations upon the report of Khan Bahadur Dr. N. H. Choksy on the trial of Professor Lustig's curative for plague submitted to you by the Municipal Commissioner for the City of Bombay.

2. The series of 142 cases is the same as that reported on by Captain Childe, I. M. S., and forwarded to you with my letter No. 4006, dated 2nd instant. The only difference worth noticing in their details is that Captain Childe records 29 deaths, whereas Dr. Choksy gives only 97; but since this discrepancy does not materially affect the conclusions to be drawn from the results, it may be disregarded.

3. The figures in each report, excluding six remaining cases, stand thus :—

			Cases.	Deaths.	Recoveries.	Mortality per cent.
Captain Childe	...	...	142	99	43	69·7
Dr. Choksy	...	...		97	45	68·4

Dr. Choksy's case mortality rate of 68·4 is therefore exactly equal to the mean mortality among 8,998 patients treated, *without any selection* by ordinary therapeutic measures in certain of the best organized plague hospitals during 1896-98, as mentioned in paragraph 2 of my letter No. 4006 above quoted. As regards the latter figures, I would remark that the close correspondence of those given in four different reports is strongly indicative of their trustworthiness.

4. Dr. Choksy compares the results by Dr. Lustig's serum with those obtained among patients in the Arthur Road Hospital not so treated, who yielded a case mortality of 79·48 per cent. This ratio seems to me a very high hospital mortality, and I am unable to allow that it can be adopted as a standard of comparison. Dr. Choksy writes that the recent epidemic was of an extremely virulent type; but it would be necessary to carefully examine the figures before accepting either this assertion, or hospital mortality of between 85 and 90 per cent. among all cases. Dr. Childe apparently considered the latter point, and remarks that he has no means of verifying the ratio.

5. Dr. Childe remarks that an endeavour was made to confine that treatment to cases of average severity which had a reasonable chance of recovery, so that patients obviously moribund, and those who were not severely attacked, did not receive the treatment. Dr. Choksy also says that moribund cases were excluded. Yet I find that each of these gentlemen has entered in his tables as moribund 12 cases which received the serum.

In my previous letter, I omitted to notice that Dr. Childe, whilst professing to exclude hopeless cases, had in fact entered 12 as moribund. As regards Dr. Choksy's remark that the death-rate amongst the cases not treated with the serum would have been higher, but for the inclusion of convalescents and semi-convalescents, I have already observed that it was, in my opinion, high enough, and not a fair criterion of the effects of ordinary medicinal treatment. Had this rate been made higher by the exclusion of convalescents, it would have been even more inapplicable for purposes of comparison.

6. The average duration of the illness at the time of admission, as taken from both reports, was in the fatal cases 2·5 days, and among the recoveries 2·4 days; so that, in this respect, the latter, so far as this record goes, had no initial advantage over the former; and the figures, as a whole, prove nothing as to the value of early injection of the serum.

7. Dr. Childe, however, shows that the mortality among 80 patients who received the serum from the first day of the disease was 73·3 per cent.; and I concur with him in the opinion that the inefficacy of this agent is strongly indicated by such a result.

8. Dr. Choksy gives the case mortality in March as 4 per cent. lower than in February; but I observe that during March the ratio of "moribund" cases to admissions was only 6·7, whilst in February it was 10·5 per centum. If the moribund cases in March had been equal in proportion to those during February, they would have numbered 7·7 instead of 5, and the case mortality would have been the same as that of February.

It is true that the severe cases were not limited to those marked "moribund"; yet I do not see that Lieutenant-Colonel Wilkins is justified in his opinion that the results obtained by the serum in March were more encouraging than those in February.

9. Comparing the mortality under each sample of serum, I note that, except in two series (Nos. I and IV), it was fairly uniform, but the figures do not appear to teach anything, except that the death ratio might be as high as 77 and 84 per cent. :—

Series.				Cases.	Deaths.	Deaths per cent.
I	...	...	...	18	14	77·7
II	...	...	...	11	8	73·6
III	...	...	...	17	10	59·0
IV	...	...	...	13	11	84·6
V	...	...	...	17	12	70·5
VI	...	...	...	47	30	64·0
VII	...	...	...	13	8	61·5
VIII	...	...	...	6	4	66·6

10. I consider, therefore, that Lustig's serum has been well, though not severely tested; and that, although the deductions to be drawn from a somewhat small number of cases may not be absolutely conclusive, this series gives practically no indications that the remedy would prove efficacious on further trial; I would remark, however, that a more accurate estimate of the value of this remedy would have been possible if two series of consecutive cases, or two series composed of alternate cases, had been utilized, the one for testing treatment by the serum, and the other, for comparison, under ordinary treatment.

I have the honor to be,

Sir,

Your most obedient Servant,

G. BAINBRIDGE, M. D., Surg.-Genl.,
Surgeon-General with the Government of Bombay.

APPENDIX No. IV.

Report on Cases treated with Professor Lustig's Serum in 1899-1900.

The Bombay Municipal Corporation having accepted, at their meeting of the 8th of May 1899, the Hon'ble Mr. Pherozeshah Mehta's proposition, "that in the opinion of the Corporation the experiments with Professor Lustig's serum should be continued for a much longer period of time," arrangements were made accordingly by the Municipal Commissioner.

As Professor G. Galeotti had to return to Italy to take up his duties there Dr. G. Polverini was given charge of the Municipal Laboratory at Parel, where the serum was being prepared, and Dr. A. Mayr, then at the Imperial Plague Research Laboratory, was appointed to assist him.

Ten more horses were purchased at different periods, the first in July and the last in December 1899, nine being country-bred and one Arab. The latter proved very sensitive, and its immunisation was much delayed, whereas the former stood the immunising injections very well, recovering quickly and keeping throughout in good condition, having been ably attended to by Mr. S. N. Ranina, V. S. One of the country-bred horses on arrival was found to be too small and weak, and was sold, as was also one of the old horses which had become useless. Another horse contracted malignant œdema in December 1899 and died. Horse No. 4, which had always given a strong serum, developed tetanic symptoms in May last and succumbed also. Two of the newly acquired animals were for a considerable time sick, independent of the immunisation, which therefore proceeded only in ten horses without hindrance. In consequence of this the manufacture of the serum could not keep pace with the demand when the admissions at the Arthur Road Hospital ran up to twenty a day in the beginning of March last, and the treatment had to be interrupted for a fortnight. For the same reason only one horse could be selected, with the sanction of the Municipal Commissioner, for the immunisation by intravenous injections which, while promising an important improvement, might have been fatal, and have further reduced the already limited number of horses. The immunisation of this horse was not taken in hand before it was made sure that the others would serve their purpose, and although progressing satisfactorily, the bleeding could not be made in time to try the serum under the alternate treatment. One patient was treated with this serum at the Modikhana Hospital in July last by order of Lieutenant-Colonel J. S. Wilkins, I.M.S., who informed us that the patient did exceedingly well. It was [not deemed advisable to experiment upon the other horses, which had to furnish the serum on the results of which the fate of the serum treatment depended, and their immunisation was carried on strictly on the lines followed hitherto. Until the new horses were ready the serum was taken from the old one which were bled two or three times more. The new horses were all bled once or twice.

During the time covered by this report 72 immunising injections and 22 bleedings were made, the latter yielding 60 litres (15 gallons) of serum—forty-five litres were used for the treatment of the patients and the remainder is in stock at the laboratory at Parel.

The total number of patients treated was 566.

The treatment of selected cases having shown that the serum has curative properties, the second stage of the experiment was to ascertain the average percentage of cures which could be obtained under those circumstances in which the serum was chiefly to be used. Hence the patients were no longer selected for the serum treatment with regard to the possibility of recovery, but taken alternately as they were admitted into the hospital, an equal number remaining as so called "Controls" under the ordinary treatment. The difference between the mortality of the two sides would then be the expression of the efficacy of the serum. The selection was thus left to the chance of the distribution, and the admissibility of such a selection rested on the presumption that, according to the law of probability, the admissions

would be divided in two parts equal in all conditions influencing the recovery. As the law of probability does not work out correctly on small figures and under different circumstances of the surroundings, it was decided that at least about 500 patients should be treated alternately at the same hospital before a final conclusion would be drawn. This method of alternate treatment was agreed upon with the Municipal Commissioner in deference to the public opinion in Bombay which had become familiar with it through the experiments with the plague prophylactic. It was hoped that this merely statistical method of investigation would do away with the objections raised against the clinical selection, and that the results would be convincing to those for the benefit of whom the serum treatment had been initiated by the Municipality of Bombay. The treatment was to be continued at the Arthur Road Hospital which receives the lowest and poorest classes of the population, representing the most unfavourable material for a serum treatment, so that it might be relied upon that the results obtained there would be obtained again under all other circumstances. It was to be directed as hitherto by Dr. N. H. Choksy, the Chief Medical Officer in charge of the hospital, who knew how to use the serum to its full advantage and could be trusted to do willingly the considerable amount of extra work the serum treatment entailed.

The alternate treatment was carried out at the Arthur Road Hospital in the following manner. Every second patient suffering from plague was, immediately after admission, injected with the serum either by the Medical Officer or, in his absence, by the Hospital Assistant on duty. Cases doubtful on admission were kept under observation until the diagnosis was established. If found to be suffering from plague they were taken for the alternate treatment in the order in which the disease was recognised. Such doubtful cases were few and far between, so that, for statistical purposes, the day of admission may be considered as the day of the beginning of the serum treatment. There were observation cases, 38 in all, with 6 recoveries, mostly patients without buboes or with pneumonia, in which the diagnosis remained doubtful till death confirmed it, or until the recovery was so far advanced, that it would have been superfluous to take them for the alternate treatment. These were called extra cases and recorded separately. As the results obtained by the serum treatment are only of value if the diagnosis of plague was substantially correct, it will not be out of place here to discuss to what extent errors might have been committed and how such errors might have influenced the accuracy of the results. We have regularly controlled the diagnosis in the patients of either side clinically, and by bacteriological means also after death, and we have in no instance failed in verifying it. Almost all the patients had buboes, and of those who had none all died except two. During the time of an epidemic the diagnosis of plague is exceedingly easy in the great majority of the cases, at least in our hospitals, where the patients come with few exceptions in an advanced stage of the disease. But even if it were otherwise, and that frequent errors should have been made, they would have been irrelevant under the alternate treatment, as they had to equalise themselves like all other conditions. Errors of diagnosis could well have reduced the mortality of all the patients, but could not have created a difference between the results of the two sides. It was more difficult to avoid mistakes in the alternation, and special precautions were taken in this direction. Two records were kept, one by the Medical Officer with all the particulars of the patients, and one by the Hospital Assistant present on admission. The patients were, moreover, divided in series according to the bleedings of every horse, and this division, and the current number in the series was made visible on the charts of temperature in the form of a fraction, to which was added a red "L" on the charts of the serum patients, and "Control" on those of the controls—"L $\frac{5}{20}$ " would thus signify the fifth serum-patient of the 20th series, and "Control $\frac{5}{20}$ " would be the corresponding control. The distribution of the patients, according to the series and the results of the treatment, are seen from the following table:—

Series.	SERUM PATIENTS.					CONTROL PATIENTS.					TOTAL.			
	Horse.	Bleeding.	Number of Patients.	Died.	Recover- ed.	Percentage of Mortality.	Number of Patients.	Died.	Recover- ed.	Percentage of Mortality.	Number of Patients.	Died.	Recover- ed.	Percentage of Mortality.
1	No.	2nd bleeding	23	15	8	65.21	23	15	8	65.21	46	30	16	65.21
2	"	2nd do.	6	2	4	33.33	6	5	1	83.33	12	7	5	58.33
3	"	2nd do.	16	12	4	75.00	16	9	7	56.25	32	21	11	65.62
4	"	1st do.	6	5	1	83.33	6	5	1	83.33	12	10	2	83.33
5	"	3rd do.	16	11	5	68.75	16	12	4	75.00	32	23	9	71.87
6	"	3rd do.	24	16	8	66.66	24	21	3	87.50	48	37	11	77.08
7	"	3rd do.	36	26	10	72.22	36	32	4	88.88	72	58	14	80.55
8	"	3rd do.	37	23	14	62.16	37	29	8	78.37	74	52	22	70.27
9	"	3rd do.	4	3	1	75.00	4	3	1	75.00	8	6	2	75.00
10	"	2nd do.	15	8	7	53.33	15	12	3	80.00	30	20	10	66.66
11	"	4th do.	23	15	8	65.21	23	13	5	78.26	46	33	13	71.73
12	"	4th do.	35	25	10	71.42	35	33	2	94.28	70	58	12	82.85
13	"	4th do.	25	18	7	72.00	25	19	6	676.0	50	37	13	74.00
14	"	1st do.	26	20	6	76.92	26	17	9	75.38	52	37	15	71.15
15	"	4th do.	24	13	11	54.16	24	18	6	5000	48	31	17	64.58
16	"	3rd do.	34	23	11	67.64	34	28	6	82.35	68	51	17	75.00
17	"	1st do.	16	10	6	62.50	16	11	5	68.75	32	21	11	65.62
18	"	5th do.	25	21	4	84.00	25	20	5	80.00	50	41	9	82.00
19	"	1st do.	25	18	7	72.00	25	23	2	92.00	50	41	9	82.00
20	"	2nd do.	11	8	3	72.72	11	9	2	81.81	22	17	5	77.27
21	"	5th do.	17	12	5	70.58	17	11	6	64.70	34	23	11	67.64
22	"	1st do.	19	13	6	68.42	19	18	1	94.73	38	31	7	81.57
23	"	1st do.	10	6	4	60.00	10	8	2	80.00	20	14	6	70.00
24	"	2nd do.	7	5	2	71.42	7	6	1	85.71	14	11	3	78.57
Total ...						68.33	480	382	98	79.58	960	710	250	73.95

In this table we have to point out two facts—first, that the serum treatment shows only in two series, *viz.*, 4 and 18, which total 31 patients, a higher mortality than the average death-rate of the controls; secondly, that in four series, *viz.*, 3, 14, 18 and 21, the mortality of the serum patients is higher than that of the controls. Still, in three of these series, *viz.*, 3, 14 and 21, the mortality of the controls is far below their average mortality, and the reduction, therefore, is accidental and due to the distribution of the convalescents, as could be shown from the charts of temperature. Looking at the total mortality in the three series, which is also well below the average mortality of the controls, there can be no doubt that the serum was effective in these three series. On the other hand, the lower mortality on the serum side does not always correspond to a reduction of the total mortality of the series. Thus the total mortality is higher than the average death-rate of the controls in six series, *viz.*, 4, 7, 12, 18, 19 and 22, which indicates clearly that the serum was without effect in these series, although the differences between the mortality of the serum patients and the controls are very considerable in four of the series, *viz.*, 7, 12, 19 and 22, being 16 per cent., 23 per cent., 20 per cent. and 26 per cent., respectively, and they point to a great efficacy of the serum. We are thus confronted with the peculiar fact that the serum was effective when the difference between the results on both sides suggested that it was not, and that the serum had no effect when the difference made us believe that it was very efficacious. This seems rather striking, and an explanation will be necessary. With regard to the effects of the serum treatment and non-serum treatment we can divide the total plague admissions into three classes—first, patients who die under either treatment; secondly, patients who recover under either treatment; and thirdly, patients who but for the serum will die. If we take 200 plague admissions and distribute them by alternation, as was done at the Arthur Road Hospital, and if we suppose, as is the case, that the mortality from plague is 80 per cent., and that the serum can reduce this mortality to 70 per cent., we might have the following distributions and results:—

TABLE 1.

Serum Patients.		Control Patients.				All Patients.
Patients who die under either treatment.	Percentage of Mortality.	Patients who die under either treatment.	Patients who but for the serum die.	Patients who recover under either treatment.	Percentage of Mortality.	Percentage of Mortality.
100	100	40	20	40	60	80

Although the serum had no chance of exercising any influence, the comparison between the two sides allows only one conclusion, *viz.*, that the serum does harm.

TABLE 2.

Serum Patients.			Control Patients.			All Patients.
Patients who die under either treatment.	Patients who but for the serum would die.	Percentage of Mortality.	Patients who die under either treatment.	Patients who recover under either treatment.	Percentage of Mortality.	Percentage of Mortality.
80	20	80	60	40	60	70

Although the serum has cured all who can be cured by it, the comparison between the two sides allows again only one conclusion, *viz.*, that the serum does harm.

TABLE 3.

Serum Patients.			Control Patients.			All Patients.
Patients who die under either treatment.	Patients who recover under either treatment.	Percentage of Mortality.	Patients who die under either treatment.	Patients who but for the serum die.	Percentage of Mortality.	Percentage of Mortality.
60	40	60	80	20	100	80

Although the serum has practically cured none, the comparison between the two sides allows only one conclusion, *viz.*, that the serum is very effective.

TABLE 4.

Serum Patients.				Control Patients.		All Patients.
Patients who die under either treatment.	Patients who recover under either treatment.	Patients who but for the serum would die.	Percentage of Mortality.	Patients who die under either treatment.	Percentage of Mortality.	Percentage of Mortality.
40	40	20	40	100	100	70

Although the serum can cure only 20 per cent., the comparison between the two sides indicates an efficacy of 60 per cent.

The four tables show the limits within which the distribution will vary continually. With the distribution the results must change continually, not only quantitatively, but also qualitatively. Only the comparison of the mortality of *all* the patients with the average mortality from plague, which latter must either be known or ascertained otherwise, tells us when the serum is effective and when it is not. The conclusion is easy. With the present ratio between the mortality from plague and the efficacy of the serum, the results obtained by the alternate treatment might be utterly fallacious. They might be fallacious so long as the serum cannot reduce the mortality from 80 per cent. to less than 30 per cent. In this case a distribution, as given in Tables 1 and 2, would be impossible. The alternate treatment of patients as a method of investigation is therefore only admissible if a minimum ratio exists between the degree of the efficacy of a remedy and the percentage of the mortality of a disease. As it is just the ratio that we have to find out, the method of the alternate treatment is illogical. This demonstration might modify the views held with regard to the value of the method of the alternate treatment of patients and might justify the unwillingness of the experimenters to subject the serum to such a test before the efficacy had approximately been ascertained by more reliable means. The proof for the efficacy of a remedy whether it is tried on clinically selected patients or on patients selected by alternation is not given by the difference between the mortality of the treated and non-treated patients, but always by the reduction of the mortality of *all* the patients. Thus the alternate treatment furnishes no other or better evidence, whereas the treatment of clinically selected patients obtains an absolutely larger number of recoveries which must always be the only aim of a treatment also in its experimental stage. The alternate treatment is not only illogical and expensive, it is also cruel, as it delivers patients to death while the remedy is at hand to preserve life. In short, it is not a method of the sick-room

but of the laboratory. Dr. Choksy and we ourselves have bitterly condemned that method whenever we had to abandon a control patient to his untimely fate whom the serum could in all probability have saved, or had to inject a patient who, as we knew, would never benefit by the pain the injection might have caused him.

The routine treatment was identical for all plague admissions—rum every two hours, cardiac stimulants, sleeping draughts, wet pack, etc., whenever needed. The serum was given exclusively by sub-cutaneous injections, that being the way in which the serum can be administered on a large scale in Indian hospitals. Twenty to 40 c.c. were given in the morning and evening. With the growing experience, one large dose of 50 to 80 c.c. once a day, if possible in the morning, was found more convenient. All patients had a full dose on admission, except those evidently convalescent, who received a nominal dose of 5 or 10 c.c. Then the dose was varied as the case required it. The utmost economy was the rule, and the serum was immediately omitted when the temperature had come down and the pulse was fairly good. The quantity of serum marked on the charts of temperature as injected gives therefore the best information of the gravity of the disease. The largest dose injected at once was 80 c.c. The largest amount injected in a single case was 320 c.c. within five days, in a patient who died, and 300 c.c. in several cases that recovered. The average quantity needed for recovery was 110 c.c., the average amount injected in patients who died was 80 c.c. The total amount of serum used at the hospital was 38 litres, only 14 of which were used for patients who recovered. The total number of injections was 1,900, of which 1,175 were made in patients who died. On an average, three injections were made in patients who died, and six in patients who recovered, the convalescents being excluded. Any unfavourable influence of large doses has never been observed; on the contrary, all the experience points to the fact that, with the present strength of the serum, large doses are the right policy. Urticaria appeared seldom after injection, and pains in the joints seemed not to be more frequent than in patients who did not receive the serum. Abscesses on the seat of injection were rare except during the height of the epidemic when several were observed in succession, no doubt due to deficient disinfection. It is surprising that abscesses were not more frequent, considering that the staff of the hospital was insufficient in number to deal with the amount of work imposed on them by the serum treatment, so that the disinfection of the skin had often to be left to the menial servants.

In order to give an idea of the conditions of the patients who recovered, a complete list with the necessary particulars is given:—

List of the Serum Patients who Recovered.

Current Number.	Hospital Number.	Caste.	Sex.	Age.	Days of illness on admission.	Manifestation of disease.	Highest temperature.	Bubo suppurated.	Number of injections.	Quantity of serum injected.	Remarks.
1	1608	Hindu	Male	35 years.	4	Femoral bubo	102°	1	5	60 c. c.	
2	1617	Do.	Do.	6 do.	5	Axillary do.	102°	...	4	30 c. c.	
3	1619	Do.	Female	28 do.	4	Inguinal do.	103°	...	4	50 c. c.	
4	1627	Do.	Male	22 do.	4	Femoral do.	100°	...	1	10 c. c.	
5	1660	Do.	Do.	20 do.	8	Axillary do.	103°	1	3	55 c. c.	
6	1666	Do.	Female	6 do.	5	Inguinal do.	101°	...	2	20 c. c.	
7	1688	Do.	Do.	30 do.	2	Cervical do.	105°	...	3	60 c. c.	
8	1744	Do.	Male	14 do.	4	Femoral do.	104°	...	2	35 c. c.	
9	1825	Do.	Female	13 do.	4	Axillary do.	103°	1	10	140 c. c.	
10	1829	Do.	Do.	8 do.	4	Inguinal do.	105°	...	4	45 c. c.	
11	1843	N. Christian	Male	12 do.	2	Do. and iliac bubo	102°	...	6	72 c. c.	
12	1824	Hindu	Do.	30 do.	3	No bubo	105°	...	8	145 c. c.	
13	1868	Do.	Do.	3 do.	5	Femoral bubo	103°	...	8	40 c. c.	
14	1880	Do.	Female	35 do.	2	Do. do.	105°	...	7	210 c. c.	
15	1891	N. Christian	Male	10 do.	1	Do. and inguinal bubo	106°	...	1	10 c. c.	Twice Haffkinised.
16	1912	Hindu	Do.	25 do.	3	Parotid and Axillary do.	104°	...	4	140 c. c.	
17	1959	Do.	Female	7 do.	2	Axillary bubo	102°	...	6	80 c. c.	
18	1988	Parsee	Male	19 do.	12	Femoral do.	104°	1	8	200 c. c.	
19	1997	Mussalman	Do.	50 do.	3	Do. do.	106°	...	1	10 c. c.	Convalescent.
20	2040	Do.	Do.	20 do.	3	Inguinal and iliac bubo	102°	...	7	200 c. c.	
21	2042	Do.	Do.	20 do.	6	Do. do.	103°	1	7	190 c. c.	
22	2045	Do.	Female	30 do.	3	Axillary bubo	104°	...	6	230 c. c.	
23	2083	Parsee	Male	32 do.	4	Inguinal and inguinal bubo	101°	...	2	50 c. c.	Haffkinised.
24	2081	Hindu	Female	10 do.	4	Femoral and inguinal bubo	101°	...	3	80 c. c.	
25	2105	N. Christian	Male	30 do.	3	Do. and iliac bubo	103°	...	4	90 c. c.	
26	2125	Hindu	Do.	25 do.	2	Axillary and Cervical do.	105°	...	7	180 c. c.	
27	2135	Do.	Do.	30 do.	11	Femoral bubo	100°	1	2	20 c. c.	Convalescent.
28	2142	Do.	Do.	25 do.	4	Inguinal do.	101°	...	1	10 c. c.	
29	2196	Do.	Female	45 do.	5	Do. do.	103°	...	7	150 c. c.	
30	2209	Do.	Male	40 do.	...	Femoral do.	102°	1	6	140 c. c.	
31	2250	Do.	Do.	50 do.	...	Inguinal do.	100°	...	2	30 c. c.	
32	2253	Do.	Do.	22 do.	3	Femoral do.	103°	1	4	95 c. c.	
33	2297	Mussalman	Do.	12 do.	1	Inguinal, Femoral and Iliac bubo...	105°	...	6	80 c. c.	
34	2323	Hindu	Female	18 do.	4	Femoral bubo	104°	1	6	110 c. c.	
35	2339	N. Christian	Male	50 do.	3	Do. do.	104°	1	7	180 c. c.	
36	2356	Hindu	Do.	12 do.	5	Axillary do.	102°	...	6	75 c. c.	Convalescent.
37	2386	Do.	Do.	28 do.	15	Do. do.	105°	1	1	10 c. c.	
38	2474	Do.	Do.	35 do.	5	Femoral, inguinal and iliac bubo...	103°	1	2	20 c. c.	
39	2514	Do.	Do.	13 do.	4	Do. bubo	103°	1	2	10 c. c.	
40	2554	Mussalman	Female	10 do.	10	Inguinal do.	98°	1	1	10 c. c.	Convalescent.
41	2664	N. Christian	Male	12 do.	3	Cervical do.	104°	...	3	35 c. c.	
42	2679	Hindu	Do.	28 do.	8	Femoral and Axillary bubo	101°	1	2	20 c. c.	
43	2693	Do.	Do.	30 do.	10	Do. inguinal and iliac bubo...	101°	1	1	10 c. c.	Convalescent. Do.
44	2714	N. Christian	Do.	22 do.	2	Do. bubo	103°	1	8	165 c. c.	
45	2724	Do.	Do.	12 do.	3	Iliac do.	104°	...	11	110 c. c.	
46	2733	Hindu	Do.	10 do.	2	Inguinal do.	103°	1	8	85 c. c.	
47	2777	Do.	Do.	60 do.	4	Do. and Axillary bubo	102°	...	5	80 c. c.	

2841	Do.	Do.	3	do.	2	Unknown.	Femoral tubu	...	...	102°	1	6	50 c. c.
16	Female	Do.	25	do.	4		Axillary do.	...	...	104°	...	7	170 c. c.
50	Male	Do.	50	do.	6		Inguinal do.	...	...	104°	1	7	140 c. c.
74	Do.	Do.	25	do.	4		Femoral and Inguinal tubu	...	...	104°	1	8	150 c. c.
52	Do.	Do.	30	do.			Cervical and do.	...	...	98°	...	3	20 c. c.
53	Do.	Do.	10	do.	9		Inguinal tubu	...	...	110°	1	1	10 c. c.
54	Female	Do.	15	do.	10		Femoral do.	...	...	100°	1	1	10 c. c.
223	Male	Do.	30	do.	4		Supra trochlear tubu	...	...	101°	1	1	15 c. c.
261	Female	Do.	10	do.	3		Double Axillary tubu	...	...	101°	...	6	82 c. c.
311	Male	Do.	20	do.	2		Do, Femoral do.	...	...	102°	...	3	59 c. c.
354	Female	Do.	22	do.	3		Iliac tubu	...	...	114°	...	9	160 c. c.
383	Do.	Do.	70	do.	11		Cervical tubu	...	...	100°	1	1	5 c. c.
388	Male	Do.	45	do.			Inguinal do	...	...	105°	...	6	110 c. c.
426	Female	Do.	25	do.	2		Axillary do.	...	...	102°	1	15	300 c. c.
442	Male	Do.	32	do.	2		Do.	...	...	102°	...	9	160 c. c.
447	Female	Do.	12	do.	2		Inguinal do.	...	...	100°	...	5	55 c. c.
434	Do.	Do.	20	do.	9		Femoral do.	...	...	104°	...	1	10 c. c.
461	Male	Do.	50	do.	8		Axillary do.	...	...	102°	...	7	120 c. c.
515	Female	Do.	8	do.	6		Double Inguinal tubu	...	...	102°	1	6	90 c. c.
576	Male	Do.	40	do.	5		Femoral tubu	...	...	102°	...	6	80 c. c.
602	Male	Do.	50	do.	6		Cervical do.	...	...	103°	...	4	60 c. c.
618	Do.	Do.	25	do.	2		Femoral do.	...	...	105°	...	10	200 c. c.
686	Do.	Do.	25	do.	2		Do.	...	...	104°	...	9	200 c. c.
752	Female	Do.	2	do.	3		Sub-lingual tubu	...	...	103°	...	6	50 c. c.
772	Do.	Do.	30	do.	8		Pectoral tubu	...	...	98°	...	1	10 c. c.
792	Male	Do.	35	do.	4		Femoral do.	...	...	102°	...	7	120 c. c.
815	Female	Do.	35	do.	4		Do.	...	...	100°	...	2	60 c. c.
817	Male	Do.	49	do.	8		Inguinal and Inguinal tubu	...	...	90°	1	1	5 c. c.
869	Do.	Do.	26	do.	15		Do.	...	...	98°	1	1	5 c. c.
896	Female	Do.	30	do.	8		Femoral tubu	...	...	90°	...	1	5 c. c.
929	Male	Do.	21	do.	7		Inguinal do.	...	...	100°	...	3	25 c. c.
833	Do.	Do.	32	do.	5		Femoral and Inguinal tubu	...	...	103°	1	6	125 c. c.
991	Do.	Do.	25	do.	3		Inguinal tubu	...	...	102°	1	1	115 c. c.
1055	Do.	Do.	14	do.	8		Cervical do.	...	...	99°	...	1	10 c. c.
1097	Muslim	Do.	10	do.	3		Axillary do.	...	...	104°	1	6	100 c. c.
1118	Do.	Do.	30	do.	4		Femoral, Inguinal and Iliac tubu	...	...	100°	1	1	10 c. c.
1131	Hindu	Do.	19	do.	13		Inguinal tubu	...	...	100°	1	1	10 c. c.
1163	N. Christian	Do.	14	do.	5		Cervical do.	...	...	103°	1	4	70 c. c.
85	Do.	Do.	15	do.	5		Axillary do.	...	...	103°	1	7	115 c. c.
1172	Female	Do.	35	do.	4		Do.	...	...	100°	...	2	50 c. c.
1191	Male	Do.	25	do.	5		Femoral and Iliac tubu	...	...	100°	...	4	75 c. c.
1257	Do.	Do.	8	do.	4		Cervical tubu	...	...	103°	...	4	50 c. c.
1252	Do.	Do.	24	do.	2		Femoral, Inguinal and Iliac tubu	...	...	104°	...	8	175 c. c.
1267	Do.	Do.	28	do.	3		Axillary tubu	...	...	105°	...	8	145 c. c.
1289	Do.	Do.	23	do.	3		Supra Clavicular tubu	...	...	10°	1	7	135 c. c.
1295	Do.	Do.	23	do.	1		Cervical tubu	...	...	104°	...	6	85 c. c.
1311	Do.	Do.	5	do.	2		Do.	...	...	99°	...	3	20 c. c.
1315	Do.	Do.	30	do.	3		Inguinal do.	...	...	105°	...	4	60 c. c.
1321	Do.	Do.	20	do.	1		Axillary do.	...	...	104°	...	8	140 c. c.
1330	N. Christian	Do.	23	do.	2		Inguinal and Iliac tubu	...	...	105°	1	6	110 c. c.
1352	Hindu	Do.	18	do.	2		Double Axillary tubu	...	...	101°	...	6	95 c. c.
1356	Do.	Do.	55	do.	2		Iliac tubu	...	...	104°	...	7	115 c. c.
1384	N. Christian	Do.	25	do.	2		Inguinal tubu	...	...	105°	...	11	210 c. c.
1385	Do.	Do.	25	do.	2		Cervical do.	...	...	101°	1	6	60 c. c.
1404	Do.	Do.	25	do.	4		Axillary do.	...	...	103°	...	6	129 c. c.

List of Serum Patients who Recovered—(contd.).

Current Number.	Hospital Number.	Caste.	Sex.	Age.	Days of illness on admission.	Manifestation of Disease.	Highest Temperature.	Bu'so suppurated.	Number of Injections.	Quantity of Serum injected.	Remarks.
105	1453	Hindu ...	Female	40 years.	9	Femoral bubo	...	.....	2	20 c. c.	Convalescent. Do.
106	1452	Do.	Male	20 do.	12	Axillary do.	...	.....	1	10 c. c.	Do.
107	1456	N. Christian	Female	20 do.	3	Inguinal do.	...	.....	6	140 c. c.	Do.
108	1460	Hindu ...	Male	23 do.	Unknown.	Inguinal do.	...	.....	7	140 c. c.	Haffkinised.
109	1464	N. Christian	Do.	18 do.	3	Femoral do.	...	.....	10	230 c. c.	Do.
110	1468	Hindu	Do.	32 do.	4	Inguinal do.	...	.....	8	190 c. c.	Do.
111	1474	Do.	Do.	25 do.	3	Axillary do.	...	.....	3	60 c. c.	Do.
112	1493	Do.	Do.	10 do.	8	Do.	...	.....	1	10 c. c.	Convalescent. Do.
113	1510	Do.	Female	12 do.	21	Femoral, inguinal and iliac bubo	...	.....	1	10 c. c.	Do.
114	1515	Do.	Male	35 do.	3	Cervical bubo	...	.....	5	120 c. c.	Do.
115	1521	N. Christian	Do.	40 do.	Unknown.	Do. and Maxil bubo	...	.....	6	150 c. c.	Do.
116	1550	Hindu	Do.	24 do.	4	Femoral bubo	...	.....	5	130 c. c.	Do.
117	1568	Do.	Female	20 do.	3	Inguinal do.	...	.....	7	160 c. c.	Do.
118	1577	Do.	Male	40 do.	6	Femoral do.	...	.....	4	80 c. c.	Haffkinised.
119	1594	N. Christian	Do.	32 do.	5	Cervical do.	...	.....	9	225 c. c.	Do.
120	1602	Hindu	Do.	12 do.	4	Do.	...	.....	5	100 c. c.	Do.
121	1833	Do.	Female	10 do.	3	Femoral do.	...	.....	7	170 c. c.	Do.
122	1861	Do.	Male	20 do.	1	Do. and iliac bubo	...	.....	9	270 c. c.	Convalescent.
123	1886	Do.	Do.	11 do.	15	Inguinal and femoral bubo	...	.....	1	10 c. c.	Do.
124	1892	Do.	Do.	40 do.	Unknown.	Femoral bubo	...	.....	1	40 c. c.	Convalescent.
125	1942	Do.	Do.	6 do.	3	Do. and inguinal bubo	...	.....	1	10 c. c.	Do.
126	1954	Do.	Female	23 do.	8	Inguinal and iliac bubo	...	.....	5	160 c. c.	Do.
127	1957	Do.	Male	20 do.	3	Femoral do.	...	.....	2	40 c. c.	Do.
128	1987	Mussalman	Do.	20 do.	Unknown.	Inguinal do.	...	.....	3	90 c. c.	Do.
129	2047	Hindu	Female	25 do.	4	Axillary do.	...	.....	4	110 c. c.	Do.
130	2045	Do.	Do.	12 do.	3	Inguinal do.	...	.....	4	110 c. c.	Do.
131	2057	Do.	Do.	18 do.	3	Cervical do.	...	.....	6	160 c. c.	Do.
132	2065	Do.	Male	20 do.	3	Femoral and iliac bubo	...	.....	3	90 c. c.	Do.
133	2126	Do.	Do.	25 do.	7	Do. bubo	...	.....	1	10 c. c.	Convalescent.
134	2156	Do.	Do.	25 do.	3	Inguinal do.	...	.....	6	200 c. c.	Do.
135	2152	Do.	Do.	21 do.	3	Do. and cervical bubo	...	.....	4	223 c. c.	Do.
136	2186	N. Christian	Do.	13 do.	2	Axillary bubo	...	.....	8	223 c. c.	Do.
137	2215	Hindu	Do.	25 do.	2	Femoral do.	...	.....	9	300 c. c.	Do.
138	2269	N. Christian	Female	25 do.	3	Inguinal and iliac bubo	...	.....	6	210 c. c.	Do.
139	2303	Hindu	Male	50 do.	2	Femoral bubo	...	.....	5	160 c. c.	Do.
140	2314	Do.	Do.	50 do.	20	Axillary do.	...	.....	1	10 c. c.	Convalescent.
141	2337	Do.	Do.	15 do.	Unknown.	Inguinal do.	...	.....	0	160 c. c.	Do.
142	2396	N. Christian	Do.	15 do.	2	Do. and femoral bubo	...	.....	4	55 c. c.	Convalescent.
143	2422	Mussalman	Do.	40 do.	11	Femoral bubo	...	.....	1	10 c. c.	Do.
144	2466	Hindu	Do.	25 do.	2	Do.	...	.....	6	200 c. c.	Do.
145	2475	Do.	Female	8 do.	3	Do.	...	.....	4	65 c. c.	Do.
146	2483	Do.	Do.	8 do.	3	Axillary and cervical bubo	...	.....	4	80 c. c.	Do.
147	2552	Do.	Male	9 do.	Unknown.	Do. and femoral do.	...	.....	3	40 c. c.	Do.
148	2572	Do.	Do.	30 do.	4	Femoral and inguinal do.	...	.....	4	140 c. c.	Do.
149	2589	Do.	Do.	28 do.	4	Axillary bubo	...	.....	6	190 c. c.	Do.
150	2658	Do.	Do.	32 do.	4	Double inguinal bubo	...	.....	6	210 c. c.	Do.
151	2765	Mussalman	Female	12 do.	Unknown.	Do. cervical do.	...	.....	7	120 c. c.	Do.
152	2772	Hindu	Male	22 do.	Do.	Popliteal bubo	...	.....	5	160 c. c.	Do.

List of the Control Patients who Recovered.

Current Number	Hospital Number.	Caste.	Sex.	Age.	Days of illness on admission.	Manifestation of Disease.	Highest temperature.	Bubo suppuration.	REMARKS.
1	1615	Hindu	Male	33 years.	5	Femoral bubo	103°	.....	Conval-scent.
2	1618	Do.	Female	4 do.	15	Do.	98°	.....	Do.
3	1628	Do.	Male	40 do.	8	Sub-maxill do.	100°	.....
4	1661	Do.	Do.	30 do.	6	Axillary do.	101°	.....
5	1671	N. Christian	Do.	22 do.	9	Inguinal do.	103°	.....
6	1708	Hindu	Do.	30 do.	2	Do. Femoral and Iliac bubo	103°	1	
7	1723	Mussalman	Do.	50 do.	22	Double Inguinal bubo	99°	.....	Conval-scent.
8	1743	Hindu	Do.	12 do.	7	Cervical and Femoral do.	99°	.....	Do.
9	1828	Do.	Female	7 do.	3	Femoral bubo	103°	.....
10	1881	Do.	Do.	45 do.	5	Axillary do.	103°	.....
11	1885	N. Christian	Male	15 do.	1	Femoral do.	99°	.....	Twice Faffkinised.
12	1886	Hindu	Do.	25 do.	2	Pneumonia	103°	.....
13	1893	Do.	Do.	20 do.	4	Double Inguinal bubo	103°	.....
14	1914	N. Christian	Do.	8 do.	2	Do. Femoral do.	104°	.....
15	1916	Do.	Do.	10 do.	3	Femoral Inguinal and Iliac bubo	103°	.....	Twice Haflkinised.
16	1941	Hindu	Female	65 do.	4	Do. bubo	101°	.....
17	1961	Do.	Do.	18 do.	Unknown.	Inguinal do.	103°	.....
18	1991	Mussalman	Male	25 do.	3	Cervical do.	103°	.....
19	1993	Hindu	Do.	18 do.	3	Inguinal and Femoral bubo	100°	.....
20	2007	Parsee	Female	14 do.	2	Do. Femoral and Iliac bubo	103°	1	
21	2041	Hindu	Male	35 do.	3	Axillary bubo	104°	.....	Conval-scent.
22	2159	Mussalman	Do.	18 do.	12	Inguinal and Femoral bubo	103°	.....
23	2212	Hindu	Do.	15 do.	8	Cervical bubo	103°	.....	Conval-scent.
24	2226	Do.	Do.	16 do.	3	Inguinal do.	101°	.....
25	2322	Do.	Female	8 do.	14	Axillary do.	103°	1	Conval-scent.
26	2355	Do.	Male	60 do.	7	Femoral and Inguinal bubo	100°	.....	Conval-scent.
27	2384	Do.	Do.	30 do.	12	Inguinal bubo	100°	.....	Conval-scent.
28	2398	Do.	Do.	7 do.	4	Femoral and Cervical bubo	100°	.....	Conval-scent.
29	2749	Do.	Do.	3 do.	3	Cervical bubo	102°	.....
30	2802	N. Christian	Do.	20 do.	12	Inguinal and Femoral bubo	103°	1	Conval-scent.
31	73	Hindu	Female	11 do.	4	Cervical bubo	102°	.....
32	75	Do.	Male	15 do.	Unknown.	Do. do.	102°	.....
33	117	Do.	Female	20 do.	22	Inguinal do.	102°	1	Conval-scent.
34	240	Do.	Male	30 do.	7	Axillary do.	101°	.....	Do.
35	248	Do.	Female	30 do.	4	Femoral and Iliac bubo...	101°	.....	Do.
36	259	Do.	Male	20 do.	9	Double Axillary do.	102°	.....
37	282	Do.	Do.	18 do.	9	Cervical bubo	103°	.....
38	318	Do.	Do.	12 do.	12	Axillary do.	103°	1	Conval-scent.
39	399	Do.	Female	8 do.	6	Femoral and Iliac bubo...	101°	1	Do.
40	416	Do.	Do.	7 do.	8	Double Cervical do.	104°	1	Do.
41	575	Do.	Male	30 do.	8	Femoral bubo	101°	.....	Haflkinised.
42	599	Do.	Do.	30 do.	2	Do. and Cervical bubo	103°	.....	Conval-scent.
43	669	Do.	Do.	1 do.	2	Double Inguinal bubo	101°	1	
44	685	Mussalman	Do.	22 do.	7	Femoral bubo	101°	.....	Conval-scent.
45	710	Hindu	Do.	45 do.	6	Inguinal and Iliac bubo	102°	1	
46	886	Do.	Do.	12 do.	Unknown.	Femoral and Inguinal bubo	101°	.....
47	1631	Do.	Do.	5 do.	Do.	Axillary bubo	98°	.....	Conval-scent.
48	1069	Do.	Do.	35 do.	2	Femoral and Inguinal bubo	103°	1	
49	1056	Do.	Do.	30 do.	3	Inguinal bubo	101°	.....
50	1111	Mussalman	Do.	35 do.	12	Cervical do.	99°	1	Conval-scent.

List of the Control Patients who Recovered—(contd.).

Current Number.	Hospital Number.	Caste.	Sex.	Age.	Days of illness or admission.	Manifestation of disease.	Highest temperature.	Bubo suppurated.	REMARKS.
51	1138	Hindu	Male	40 years	Unknown.	Double Femoral bubo	101°	.....	Convalescent.
52	1140	Do.	Do.	24 do.	2	Supra hyoidal bubo	105°	1	
53	1164	Do.	Do.	20 do.	3	Cervical bubo	104°	1	
54	1211	Do.	Do.	8 do.	4	Inguinal do.	104°	.....
55	1168	Do.	Female	30 do.	6	Femoral do.	104°	.....
56	1298	N. Christian	Male	13 do.	8	Cervical do.	104°	1	Convalescent.
57	1256	Hindu	Female	6 do.	2	Supra hyoidal bubo	99°	.....
58	1250	Do.	Male	23 do.	2	Axillary bubo	104°	.....	Half-killed.
59	1270	Do.	Do.	22 do.	1	Inguinal do.	106°	1	
60	1273	Do.	Female	20 do.	6	Femoral do.	105°	.....
61	1282	Do.	Male	15 do.	2	Inguinal do.	104°	1	
62	1293	Do.	Female	25 do.	2	Do.	104°	.....
63	1316	Mussalman	Male	20 do.	2	Double Inguinal bubo	99°	.....	Half-killed.
64	1357	N. Christian	Do.	15 do.	11	Inguinal and Cervical bubo	100°	.....	Convalescent.
65	1349	Hindu	Do.	32 do.	3	Pectoral bubo	103°	.....
66	1386	Do.	Female	12 do.	2	Femoral and Iliac bubo	103°	1	Convalescent.
67	1395	N. Christian	Male	35 do.	10	Inguinal and Iliac do.	98°	.....
68	1405	Do.	Do.	30 do.	2	Axillary bubo	104°	.....	Convalescent.
69	1420	Hindu	Do.	5 do.	Unknown.	Cervical do.	101°	.....
70	1433	Do.	Do.	8 do.	6	Femoral Iliac and Inguinal bubo	104°	1	
71	1455	Do.	Female	16 do.	5	Cervical bubo	105°	.....
72	1485	Do.	Male	35 do.	2	Femoral and Iliac bubo	103°	1	
73	1489	Do.	Female	35 do.	4	Cervical bubo	103°	.....
74	1548	N. Christian	Male	52 do.	3	Inguinal do.	100°	.....	Convalescent.
75	1562	Hindu	Do.	35 do.	10	Cervical and Axillary bubo	101°	1	
76	1588	Do.	Female	7 do.	4	Femoral and Inguinal do.	104°	.....
77	1590	Do.	Male	10 do.	8	Femoral bubo	103°	1	Convalescent.
78	1825	Do.	Do.	36 do.	8	Inguinal do.	99°	1	Do.
79	1829	Do.	Do.	12 do.	20	Femoral do.	99°	.....
80	1849	Do.	Female	20 do.	3	Do.	104°	1	
81	1877	Do.	Male	30 do.	8	Cervical do.	98°	.....	Convalescent.
82	1897	Do.	Do.	6 do.	8	Femoral and Inguinal bubo	101°	.....	Do.
83	1935	N. Christian	Do.	40 do.	6	Do.	105°	1	Convalescent.
84	1913	Hindu	Do.	30 do.	3	Inguinal and Iliac bubo	105°	.....
85	1999	Do.	Do.	22 do.	8	Double Inguinal do.	103°	1	Convalescent.
86	2035	Do.	Do.	40 do.	10	Femoral and Iliac do.	103°	.....
87	2103	Do.	Do.	23 do.	15	Femoral and Cervical bubo	104°	1	Convalescent.
88	2169	Do.	Do.	20 do.	10	Inguinal bubo	102°	1	Do.
89	2184	Do.	Do.	25 do.	7	Femoral do.	104°	1	
90	2191	Do.	Do.	20 do.	7	Do.	104°	.....
91	2231	Do.	Do.	25 do.	8	Do.	100°	.....
92	2243	Do.	Do.	15 do.	8	Axillary and Cervical bubo	103°	.....
93	2286	Do.	Female	28 do.	2	Do.	103°	1	
94	2309	Do.	Do.	9 do.	7	Femoral and Inguinal bubo	103°	.....
95	2332	Do.	Do.	35 do.	3	Axillary bubo	98°	.....	Convalescent.
96	2194	Mussalman	Do.	25 do.	26	Inguinal do.	104°	1	
97	2544	Hindu	Male	8 do.	2	Axillary do.	105°	.....
98	2779	Do.	Do.	16 do.	2		.....	.....

A number of patients is put down as convalescent in the lists, *viz.*, 28 among the serum patients and 33 among the controls. They have no value in the experiment, as they were admitted on such a late day of illness that the influence of the serum was excluded. The number of convalescents recorded here does not tally exactly with that given by Dr. Choksy, *viz.*, 28 for the serum side and 38 for the controls. Dr. Choksy's criterion of the convalescence was a clinical one, whereas we call all those patients convalescent who had passed the acute stage of plague when they were admitted. Although our distinction means a numerical gain to the control side we have preferred it because it gives the possibility of proving the number of convalescents from the figures in the lists. We gather from the lists that the serum treatment gave 152 recoveries * and the ordinary treatment 98 recoveries, and that one-fourth of all the patients who recovered was convalescent on admission. As the efficacy of the serum must be judged by the results obtained on patients who were actually sick with plague, the convalescents must be excluded from our account. We give in the following table the original figures and the corrected ones:—

	SERUM PATIENTS.			CONTROL PATIENTS.		
	Admitted.	Died.	Recovered.	Admitted.	Died.	Recovered.
Original figures	480 (28 convalescents.)	328	152 (28 convalescents.)	480 (33 convalescents.)	382	98 (33 convalescents.)
Corrected figures.	452 (no convalescents.)	328	124 (no convalescents.)	447 (no convalescents.)	382	65 (no convalescents.)

Calculating the ratio between the recoveries of either side, we find that for every 100 patients who recovered by the serum 53 patients recovered by ordinary methods. If we take the ratio between the recoveries amongst the patients admitted on the first five days of illness, *viz.*, admitted during the acute stage of the disease, it is still more in favour of the serum, as for every 100 serum patients who recovered only 49 recovered amongst the controls. We can, therefore, say that the serum has doubled the recoveries for the acute stage of plague. We see further from the lists that 59 buboes supplicated under the serum treatment and 40 under the ordinary treatment corresponding to 38·50 per cent. and 41·00 per cent., respectively. The difference seems trifling, but it increases considerably if we take into account only the patients admitted on the first and second day of illness. We have then 33 patients with 10 suppurating buboes on the serum side and 18 patients with 10 suppurating buboes on the control side. The statistics thus confirm the clinical observation that buboes reabsorb oftener in serum patients. It is natural that the serum treatment should prevent the suppuration only in the patients of the earlier days.

In order to show how the serum was administered, how it acted, and also for the sake of comparison, there are attached the charts of the first 30 patients who recovered during the alternate treatment, one chart of a patient treated in private practice with the serum and two charts of patients who died under the serum treatment. No other clinical details are given than the temperature during the acute stage of the disease. Considerations of economy forbade the publication of more charts which would have furnished the best proof for the efficacy of the serum. We draw the attention to chart No 12 of a patient who received the serum treatment although no sure signs of plague were found when it was commenced. Cases of a similar nature had previously been observed and considered as extra cases,

* One patient died when this report was being prepared.

the bacteriological examination having been negative even after death. The patient was admitted on the third day of illness in a stupor and very low condition. He was kept under observation for three days, and as the disease seemed to take the same fatal turn as in the cases mentioned, he was declared and came to the serum treatment. The temperature had been 104.5° on the previous evening and had fallen to 102.5° on the morning of the fourth day. It was again rising, the thermometer showing 103° at 11 o'clock, when 20 c.c. of the serum were injected. After three hours the temperature had fallen to 101.5° . It rose to 102.5° until 4 p. m., when another 20 c.c. were given which brought the temperature to 101° at midnight. On the next morning the general condition was much improved, the patient was conscious and able to speak. Five more injections had to be made till the temperature fell finally to normal on the morning of the fourth day of the treatment. The recovery was speedy and uninterrupted. Simultaneously with the first injection blood was taken for examination, from which a fairly abundant growth of plague bacilli was obtained. There was no more occasion to try the serum in such cases as they became rare and happened to come to the control side. The chart of the private patient is interesting, because an exceptionally large quantity of serum was injected within a short time. The patient came under treatment on the evening of the fourth day of illness with swollen glands all round the neck and extreme infiltration and œdema glottidis which threatened suffocation. Dr. Choksy realising the gravity of the situation resorted to doses not tried before. The temperature was 105° when he injected the first 60 c.c. It fell but by one degree until the next morning, when another 60 c.c. were given. In spite of that the temperature went up to 105.5° in the evening, when 60 c.c. more were injected. On the next morning the temperature was 102° ; still a further injection of 60 c.c. was thought advisable, the patient having thus received 240 c.c. of serum within 36 hours. There was no evening rise, almost invariably a favourable sign, and the treatment was discontinued and the last 30 c.c. were given on the next morning. From this time the temperature fell steadily, the patient making a good recovery, all buboes reabsorbing. From the two charts of the serum patients who died, it appears that death was not due to plague. The patients were transferred from the J. J. Hospital with well developed buboes and all other symptoms of plague. They seemed on the highway to recovery when relapsing fever set in, to which the patients eventually succumbed. Relapsing fever, complicated with plague, must have been common during the past years: relapsing fever is a disease of longer duration, it was prevalent in epidemic form, and it attacks with predilection the same class of the population as plague does. Clinically, it cannot be diagnosed with certainty during the acute stage of the plague.

The alternate treatment was properly commenced on the first of July, 1899, and was continued until the 31st of July, 1900, when it was abandoned by order of the Municipal Commissioner in favour of the clinical selection. As already in May, 1899, the patients had been alternately treated, the record for this month has also been included in this report, although it is incorporated in that of the last year. July, 1900, has been excluded, as the results were not known when the report was taken in hand. Only 4 cases were treated on either side in that month. Three of the serum patients recovered and three of the controls died. The records for the single months are seen from the following table :—

ARTHUR ROAD HOSPITAL.										MARATHA HOSPITAL.										
MONTHS.	SMBUM PATIENTS.				CONTROL PATIENTS.				EXTRA PATIENTS.				TOTAL.				ORDINARY TREATMENT.			
	Number of patients.	Died.	Recovered.	Percentage of mortality.	Number of patients.	Died.	Recovered.	Percentage of mortality.	Number of patients.	Died.	Recovered.	Percentage of mortality.	Number of patients.	Died.	Recovered.	Percentage of mortality.				
1899.																				
May ...	23	15	8	65.21	23	15	8	65.21	6	4	2	52	34	18	96	25	79.33			
July ...	21	13	8	61.90	21	14	7	66.66	6	6	...	48	33	15	34	14	70.83			
August ...	15	12	3	80.00	15	10	5	66.66	...	...	...	30	22	8	39	8	82.97
September ...	17	9	8	52.94	17	16	1	94.11	4	3	1	38	28	10	56	13	81.16			
October ...	26	21	5	80.77	25	22	3	88.00	7	5	2	58	48	10	58	19	75.32			
November ...	15	10	5	66.66	16	12	4	75.00	...	...	...	31	22	9	71	12	85.54
December ...	25	14	11	56.00	25	23	2	92.00	6	5	1	56	42	14	171	49	77.72			
1900.																				
January ...	59	38	21	64.40	59	45	14	76.27	2	2	...	120	85	35	275	61	81.84			
February ...	86	64	22	74.41	85	68	17	80.00	5	5	...	176	137	39	416	88	82.54			
March ...	74	45	29	60.81	75	59	16	78.66	...	...	...	149	104	45	487	109	81.71
April ...	80	61	19	76.25	79	62	17	78.48	1	1	...	160	124	36	294	62	82.58			
May ...	31	21	10	67.74	32	29	3	90.62	1	1	...	64	51	13	107	35	75.35			
June ...	8	5	3	62.50	8	7	1	87.50	...	...	...	16	12	4	.....	.....	.....
Total ...	480	328	152	68.33	480	382	98	79.56	38	32	6	998	742	256	2,104	495	80.95			

In the table are included the extra cases in order to allow a comparison with the records of the Maratha Hospital which are also given for the last official year. With regard to this table it may not be superfluous to mention that the mortality amongst the serum patients, and the total mortality, compared favourably with that of the controls, when the serum treatment had to be discontinued in March last, and that the total mortality for the first half of the month, when the serum was used, was more than 5 per cent. less than for the second half when it was not employed. The comparison with the Maratha Hospital shows that the monthly mortality at the Arthur Road Hospital, except during October, 1899, and May, 1900, was lower than at the former, and that the lower mortality was maintained during the four months, January to April, 1900, when the epidemic was at its height. It is of special interest to observe how the mortality at the Arthur Road Hospital followed the fluctuations of the death-rate at the other hospital during the above-mentioned months. In February and April the disease showed the highest virulence, and the difference of the mortality of the two hospitals is 5 per cent., in January and March the virulence was a trifle less, and the difference increased to 11 per cent. The higher figures on which the mortality works out during these months are a safeguard that the increase was not accidental, and we shall see later on that it corresponds to a law of sero-therapeutics. The mortality for the period of the alternate treatment was less by 6·5 per cent. at the Arthur Road Hospital, although only half the patients received the serum treatment. If all the patients had received it the reduction of the mortality would have to be calculated at 13 per cent. The difference between the mortality of the serum patients and the controls at the Arthur Road Hospital itself is 11·25 per cent. and, therefore, fairly conforms with the calculated difference of the mortality of both the hospitals. It is this conformity which gives the proof that the reduction of the death-rate on the serum side is real. It might be suggested that the mortality at the Arthur Road Hospital is generally lower than at the Maratha Hospital. Although there seems to be no apparent reason for this, the Maratha Hospital receiving the higher Hindu castes, we thought it useful to meet this suggestion with facts and figures. The Maratha Hospital opened on January 21st, 1898, as we find from Sir James Campbell's Report of 1897-1898. The plague mortality up to the 30th of April, 1898, amongst 738 patients under English treatment, was 73·44 per cent. During the same period, also including one month and a half of the serum treatment, which was commenced on the 13th March, the Arthur Road Hospital had 1,231 admissions with a mortality of 74·16 per cent. It had 273 admissions with 222 deaths, equal to a mortality of 81·31 per cent. in November and December, 1898, and January, 1899, when no serum was available. During these months the Maratha Hospital had 557 admissions with 453 deaths, equal to a mortality of 81·32 per cent. The mortality during the time when no serum was used was, therefore, somewhat higher at the Arthur Road Hospital.

It follows from the last table that the mortality amongst the serum patients was 68·33 per cent. and amongst the controls 79·58 per cent., the difference being 11·25 per cent. in favour of the serum. The alternate treatment was started under the impression that this difference would be the expression of the efficacy of the serum. We have been obliged to demonstrate that such might, or might not, be the case, and to undermine thus the very ground on which we were to base our arguments for the efficacy of the serum. Truly, not an enviable position in which we find ourselves. There is only one way out of this difficulty. The results obtained by the alternate treatment might be accepted as essentially correct if the three classes in which we have divided the patients with regard to the effects of the serum and non-serum treatment were evenly distributed on both sides. That cannot be ascertained directly, but we might find it out indirectly by going into the details of the distribution of the patients as regards caste, sex, age, individual resistance, duration, mode and virulence

of infection. If the patients were fairly distributed according to these factors, we could be certain that the same was the case also with respect to the three classes mentioned. We shall, therefore, compare in the following the details of the distribution one by one in the order given above, so far as it is statistically feasible. The material for the statistics is taken from the charts of temperature of our patients, which we have gone through carefully ourselves. We begin with the statistics of the distribution according to the caste:—

Caste.		Hindus.	Mussalmans.	Native Christians.	Parsees.	Total.
Serum patients	...	404	21	47	3	480
Control patients	...	405	27	40	8	480

No comments are necessary on this table. The same can be said of the following, showing how the patients were distributed according to the sex:—

Sex.			Males.	Females.	Total.
Serum patients	... ..		350	130	480
Control patients	... ..		353	127	480

The next table gives the distribution with regard to the age period:—

Age period.	0-10 years.	10-20 years.	20-30 years.	30-40 years.	40-50 years.	50 years and more.	Total.
Serum patients ...	50	129	162	81	37	21	480
Control patients ...	60	127	159	99	25	10	480

The distribution is here in favour of the controls which have 10 more children, among whom the mortality is about 12 per cent. lower than the average, and 23 fewer patients over 40 years, among whom the mortality is higher than the average.

The individual resistance is dependent on caste, sex, age and previous immunisation. The benefit of the latter was identical, as on either side eleven patients had been inoculated with the plague prophylactic.

With regard to the days of illness on admission the patients were distributed as follows:—

Day of illness on admission.	1st day.	2nd day.	3rd day.	4th day.	5th day.	6th day.	7th day.	8th day.	9th day.	10th day & more.	Un-known	Total.
Serum patients...	18	121	136	79	32	17	4	16	4	19	34	480
Control patients.	20	120	160	67	38	25	13	20	4	26	47	480

The advantage lies here again with the controls. It is well known that the mortality from plague in our hospitals is highest amongst the admissions of the earlier days. A marked reduction of the mortality only takes place in the patients admitted after the fifth day of illness. If we divide the cases accordingly, we find

on the serum side 386 patients of the first 5 days of illness with a mortality of 71·76 per cent., and on the control side 345 such patients with a mortality of 86·08 per cent. The patients of the sixth and the following days of illness are 60 on the serum side with a mortality of 45·00 per cent. and 88 on the control side with a mortality of 51·13 per cent. The serum side had thus 41 more patients who had under the ordinary treatment a mortality of 86·08 per cent. and 28 fewer patients who had a mortality of 51·13 per cent. These facts represent a material advantage for the controls, and they demonstrate at the same time that Dr. Choksy estimated correctly the number of convalescent patients on both sides. We see, moreover, that the reduction of the mortality due to the serum was almost entirely obtained in the patients in the acute stage of the disease.

We come now to compare the distribution according to the manifestation of the disease which indicates to some extent the mode and virulence of the infection. For statistical purposes, the manifestations of the disease have been brought in such groups as show generally a distinct difference of the mortality between each other, the single femoral or inguinal, or other single buboes of more rare occurrence with the lowest mortality heading the columns in the following table. Contiguous buboes are such as femoral and inguinal, femoral and iliac, etc. Only the buboes present on admission were taken in consideration :—

Manifestation of disease.	Single inguinal, femoral buboes.	Single Cervical buboes.	Single Axillary buboes.	Contiguous buboes.	Multiple buboes.	No. buboes.	Pneumonia.	Total.
Serum patients ...	170	52	88	131	32	3	4	480
Control patients ...	167	46	100	128	20	16	13	480

The advantage is here on the serum side which has 13 more cases of single inguinal or femoral buboes, showing the lowest mortality, and 34 fewer cases with axillary buboes, without buboes or with pneumonia, which have the highest mortality. Also, without calculating numerically the statistical value of this advantage, this much can be said with certainty that it cannot have preponderated over the benefit the controls derived from the distribution according to the days of illness where every second patient of the later days represented a recovery.

The following table gives the distribution according to the temperature on admission ; for a fraction of a degree the next lower degree has been recorded.

Temperature on admission.	100° F.	101° F.	102° F.	103° F.	104° F.	105° F. and more.	Total.
Serum patients ...	141	79	97	88	54	21	480
Control patients ...	127	78	112	95	47	21	480

The temperature on admission gives little information as to the severity of the attack, high temperatures being frequently due to the excitement of the transport, whereas low ones in the acute stage of plague are often signs of collapse and impending death. All we can guess from the table is that there are no differences worth mentioning.

There are no more items allowing of a statistical comparison and we can review the facts as follows. The distribution, according to the caste, sex, previous immunisation and temperature on admission, was practically the same for both sides. With regard to the age period and the days of illness on admission the distribution has

favoured the controls, and with respect to the manifestation of the disease, the serum treatment. There is no aim in urging that clinically the advantages on the control side were more important, and we are satisfied if it be admitted that the distribution was *not in favour of the serum*.

Now we can accept the results at the Arthur Road Hospital as correct without fear of being contradicted by any one whose syllogisms are directed by the principles of logic, and we can say that cures have been effected by the serum treatment, which could not have been effected by any other known means. Compared with that fundamental fact the percentage of the cures is of minor importance, as it is a variable quantity which can change only in one direction—in the direction of progress. The treatment of plague with Professor Lustig's serum has thus passed once for all the stage of experiment, its efficacy has become an established fact, against which scepticism would no longer be legitimate.

Hence the serum treatment of plague will be an acknowledged implement in the armoury of the physician, restoring life and health to many, and will rank side by side with that of diphtheria as a great achievement which represents a further and important step towards the solution of the problems of serotherapeutics, it being the second instance in which indisputable evidence has been brought forward for the efficacy of serotherapy in human beings.

Having demonstrated the efficacy of the serum we shall analyse the results obtained in order to solve a question of practical importance, *viz.*, under what circumstances the serum was most efficacious. From *a priori* considerations we have to expect that the mortality under the serum treatment followed on a lower level closely the fluctuations of the general mortality from plague. Indeed, should we not find any indication of this principle in the course of our investigations, we could even doubt the proofs furnished hitherto. On the other hand, we cannot exclude that there might be considerable deviations from that rule, due to the peculiarity of the remedy or the disease, or to other influences which it would be necessary to trace. If we find such deviations we shall have to ascertain whether they were accidental or the expression of a law governing the application of the serum. In order to answer our query we shall resort again to the statistics. With regard to them we have to remember that the information we may get might not always be of an absolute but only of a comparative value, or even valueless owing to the small number of observations on which the statistics might be based in single instances. In such a case we might be obliged to control our statistics by those drawn from larger figures. On the whole, we shall find that the results on the serum side are more congruous with those of the general statistics, as the action of the serum and the larger number of recoveries tended to neutralise disturbing influences, of which the distribution of the convalescents was the most important one on the control side. We shall go through our statistics in the same order as before and begin with that showing the results according to the caste:—

Caste.	Serum patients.				Control patients.			
	Number of patients.	Died.	Recovered.	Percentage of mortality.	Number of patients.	Died.	Recovered.	Percentage of mortality.
Hindus	404	282	122	69·80	405	326	79	80·49
Mussalmans	21	14	7	66·66	27	20	7	74·07
Native Christians ...	47	26	21	55·32	40	29	11	72·5
Parsees	8	6	2	75·00	8	7	1	87·5
Total	480	328	152	68·33	480	382	98	79·58

The results shown in this table fulfil our expectations, the mortality of the serum patients repeating the fluctuations on the other side. We note here that the reduction of the average mortality of the controls by 7 per cent. in the case of Native Christians corresponds to a reduction of 24 per cent. on the serum side:—

The next table gives the results according to the caste and sex:—

Caste and Sex.				Serum Patients.				Control Patients.			
				Number of patients.	Died.	Recovered.	Percentage of Mortality.	Number of patients.	Died.	Recovered.	Percentage of Mortality.
Hindus ...	Males ...	...	...	291	207	84	71·13	293	236	57	80·54
	Females ...	...	...	113	75	38	66·37	112	90	22	80·35
Mussalmans ...	Males ...	...	...	18	13	5	72·22	22	16	6	72·72
	Females ...	...	...	3	1	2	33·33	5	4	1	80·00
Native Christians ...	Males ...	...	...	37	19	18	51·35	33	22	11	66·66
	Females ...	...	...	10	7	3	70·00	7	7	...	100·00
Parsees ...	Males ...	...	...	4	2	2	50·00	5	5	...	100·00
	Females ...	...	...	4	4	...	100·00	3	2	1	66·66
Total ...				480	328	152	68·33	480	382	98	79·58

Considering only the larger figures we see that Hindu males have the highest mortality on both sides. Contrary to the facts of the general statistics, which show that Hindu females have a distinctly lower mortality than Hindu males, there is hardly any reduction in Hindu females on the control side. It is otherwise under the serum treatment. Already during the time of the selection of the patients it was observed that females answer better to the serum treatment than males. In the cases of Native Christians it is interesting that the chief reduction of the mortality shows itself on both sides in males. This is correct, Native Christian males having generally a much lower death rate than females.

The results, according to the age period, are seen from the following table:—

Age period.	Serum Patients.				Control Patients.			
	Number of Patients.	Died.	Recovered.	Percentage of Mortality.	Number of Patients.	Died.	Recovered.	Percentage of Mortality.
From 0-10 years...	50	25	25	50·00	60	40	20	66·66
„ 10-20 „ ...	139	90	39	69·76	127	95	32	74·80
„ 20-30 „ ...	162	105	57	64·81	159	135	24	84·90
„ 30-40 „ ...	81	62	19	76·54	99	84	15	84·84
„ 40-50 „ ...	37	28	9	75·67	25	22	3	88·00
„ 50-60 „ and more	21	18	3	85·71	10	6	4	60·00
Total ..	480	328	132	68·33	480	382	98	79·58

Children had also during the time of the selection a mortality of 50 per cent. They give the best results under the serum treatment. That the mortality from plague is generally lower among children than in adults is noteworthy as in other infectious diseases the full-grown individuals are more resistant. The two following periods show especially on the control side differences of the mortality which are

not to be found in large statistics, from which we learn that the mortality is much the same for both the periods and scarcely lower than the average. This discrepancy might be partly accidental and in part due to the inaccuracy of the patients in stating their age. The later periods show an increased mortality in the right proportion.

Concerning the patients who were prophylactically injected it will be sufficient to say that 7 such patients recovered on the serum side and 6 amongst the controls.

We pass now on to the table showing the results according to the days of illness on admission :—

Day of illness on admission.	Serum Patients.				Control Patients.			
	Number of Patients.	Died.	Recovered.	Percentage of Mortality.	Number of Patients.	Died.	Recovered.	Percentage of Mortality.
1st day	18	11	7	61·11	20	18	2	90·00
2nd „	121	95	26	78·51	120	103	17	85·83
3rd „	136	96	40	70·58	100	84	16	84·00
4th „	79	55	24	69·62	67	57	10	85·07
5th „	32	29	12	62·50	38	35	3	92·10
6th „	17	13	4	76·47	25	17	8	68·00
7th „	4	2	2	50·00	13	7	6	53·84
8th „	16	6	10	37·50	20	11	9	55·00
9th „	4	1	3	25·00	4	1	3	25·00
10th „ and more.	19	5	14	26·31	26	9	17	34·61
Unknown	34	24	10	70·58	47	40	7	85·10
Total	480	328	152	68·33	480	382	98	79·58

The figures in this table have only a relative value as they are chiefly based on the statements of the patients or their friends. In general, we may say that they are more reliable for the earlier days and that the duration of illness is, if anything, given as too short. Only 4 per cent. of all the patients were admitted on the first day, and only two amongst twenty recovered on the control side. The statistics corroborate thus the clinical observation that only the severest cases are brought to the hospital on the first day. Still the mortality on the serum side is well below the average. It rises by 17 per cent. for the patients admitted on the second day. Then a marked falling off for those of the third day, and a steady decline for the patients of the following days. The mortality amongst the controls is practically the same on the first 5 days of illness, the excessive mortality on the first and fifth day being accidental. We have to record here an essential difference of the results. The curve of mortality of the patients admitted on the first 5 days forms an angle on the serum side and is a straight line on the control side. It was irrelevant for the controls on what day they came to the hospital, whereas it made a considerable difference whether a patient received the serum treatment on the first day or on the second day. So long as the necessity of the early treatment is not fully appreciated and acted upon by the public and the medical profession, the results of the serum treatment will never be as satisfactory as they could be. A famous surgeon was wont to tell his pupils that if they be called to an incarcerated hernia in day time they should not allow the sun to set, and if at night not allow the sun to rise, without having liberated it. *Mutatis mutandis* that must be the principle of the physician in the serum treatment of plague. *One hour lost might be a life lost.*

The next table gives the results according to the manifestation of the disease :—

Manifestation of Disease.	Serum Patients.				Control Patients.			
	Number of Patients.	Died.	Recovered.	Percentage of Mortality.	Number of Patients.	Died.	Recovered.	Percentage of Mortality.
Single inguinal, femoral, etc., buboes.	170	97	73	57.05	157	122	35	77.70
Single Cervical buboes ...	52	38	14	73.07	46	33	13	71.73
Single Axillary buboes ...	88	64	24	72.72	100	88	12	88.00
Contiguous buboes.	131	102	29	77.86	128	99	29	77.34
Multiple buboes ...	32	21	11	65.62	20	12	8	60.00
No buboes ...	3	2	1	66.66	16	16	...	100.00
Pneumonia ...	4	4	...	100.00	13	12	1	92.30
Total ...	480	328	152	68.33	480	382	98	79.58

We note here the considerable reduction of the mortality effected by the serum in single femoral or inguinal buboes, and also in axillary buboes. It can be seen from the list of the recovered patients that this reduction was not due to the distribution of the convalescents, which has materially interfered with the correctness of the results in cervical and multiple buboes. Here again the serum has singled out for its action certain patients, *viz.*, those in whom the disease was localised.

The statistics of the results, according to the temperature on admission, did not promise much information, and we have substituted a table demonstrating not the saving of life, but the prolongation of life :—

Died after admission.					Within 12 hours.	Within 24 hours.	Within 48 hours.	Later on.
Serum patients	...	...	...	...	12.50%	8.95%	18.33%	28.54%
Control patients	...	...	...	...	16.87%	12.50%	20.65%	29.58%

The influence of the serum made itself felt even in patients who in the common course died within 12 hours after admission. Comparing the percentage of the total deaths within 48 hours after admission we have 191 patients, or 39.79 per cent., dying under the serum treatment, and 240 or 50 per cent., amongst the controls, this being the usual percentage of deaths within 48 hours after admission occurring in our plague hospitals. In 20 per cent., therefore, of those who would have died within 48 hours after admission life has been prolonged by the serum treatment. The serum patients lived on an average 4.3 days and the controls 3.2 days. That will reassure those who might still be afraid that in certain cases the serum might be injurious. Careful observation on nearly 1,000 patients has shown that it never does harm, either to moribunds or others.

There are no more statistics available, and we can summarise the information we have gained as follows :—

In general, our anticipations have been justified, the mortality under the serum treatment following the fluctuations of the death-rate on the control side closely on a lower level save for being disproportionately lower in :

- (1). Patients of the 1st, 3rd, 4th and 5th day of illness.

This is in accordance with the first law of serotherapeutics, that the earlier the treatment the better the results. It is no contradiction that the patients of the third and the following days had a lower mortality than those of the second day. A similar observation was made in the selected patients and it has been commented

upon in our previous report to which we refer. The plague, as already stated by the German Plague Commission, is characterised by subsequent attacks of a few days duration, the first attack being the most fatal.

- (2). Native Christians.
- (3). Hindu females.
- (4). Children.
- (5). Patients with single buboes.

The disproportionate reduction in these four classes, which have also under the ordinary treatment a lower mortality than the average, corresponds to another law of serotherapy, which we might formulate thus: "Under those conditions where the average mortality from an infectious disease decreases naturally, the decrease under the influence of a serum treatment takes place in a much higher ratio." Thus a serum of a given strength, which would reduce an average mortality of 80 per cent. to 70 per cent., would not give the same difference of the percentages or the same proportion of the reduction if the average mortality were 70 per cent. to begin with. A mortality of 70 per cent. might be reduced to 50 per cent., and less. That is, in the last instance, due to the fact that the germs of an infectious disease multiply in an arithmetical progression, and that the serum becomes more effective in the same ratio as the germs become less in numbers. Following on this law we understand not only the deviations in our statistics, but also why the serum treatment gave so much better results in 1897 when the mortality was considerably lower than it has been in the following years. We understand also the exceedingly favourable reports which came from places where the mortality from plague was much lower than it is in Bombay. A lower mortality means a less virulent infection; a less virulent infection a less rapid course of the disease, *viz.*, a longer interval between the infection and the fatal issue and an enhanced possibility of timely intervention. Here the two laws of serotherapeutics meet, they are indeed one, and we are at the old argument again, *ceterum censeo curam non esse differendam*.

The deviations we have found in the statistics are not striking, and cannot be so, considering that the mortality was 80 per cent. and the reduction 11 per cent. Each one of them could well be accidental. But what cannot be accidental, what excludes every possibility of an error is their concurrence, their harmony with the laws of serotherapy and with the clinical observations. With regard to the latter we can say that they are fully borne out by the statistics. We point in this relation to the statements made in last year's report, *viz.*, that the serum gives the best results in children, in patients with simple bubonic plague, that it is effective also on the fourth and fifth day of illness, that the buboes reabsorb oftener, and that life is prolonged. The analysis of the results obtained has thus not only answered our query when the serum is most efficacious, it has also furnished another and most convincing proof for the efficacy of the serum. Whereas the conditions of the patients were originally the same on both sides, the results were different, on the whole, and in the details, and the differences were not irregular but governed by a law and must logically be ascribed to the one new factor that was intentionally introduced on the one side, *viz.*, to the serum treatment.

Practically, the outcome of the analysis is important in two directions. It is obvious that a Hindu male with contiguous buboes, all other conditions equal, will have a worse prognosis and will require larger doses than a Native Christian male with a single inguinal bubo.

There is nothing more to be said about the alternate treatment, and we have only to mention that four selected cases were treated with the serum in June, 1899, at the Arthur Road Hospital and had one recovery, whereas the 14 remaining patients had two recoveries.

We turn now to the Modykhana Hospital, where in February last an attempt was made to treat patients alternately with the serum. Owing to the pressure of work and the great distance of the hospital from the laboratory at Parel the undersigned were unable to visit it in order to control the carrying out of the experiments which was entirely left to the Medical Officer in charge who had received the necessary instructions. The results are seen from the following table :—

Modikhana Hospital 26th January, to 27th February 1900.				Number of patients.	Died.	Recovered.	Percentage of Mortality.
Serum patients ...	...	...	...	66	54	12	81·81
Control patients	...	...	...	66	48	18	72·72
Doubtful cases ...	...	...	...	43	32	11	74·41

Although the failure of the serum treatment might have been merely due to the distribution of the patients, it seemed strange, and stranger still, the large number of doubtful cases.

A minute investigation elicited the following facts :—

- (1). That 21 of the so-called doubtful cases were undoubted cases of bubonic plague, with buboes either on admission or developing buboes in the hospital and that the greater part of the others were either suffering from plague pneumonia or showed other undoubted symptoms of plague. These cases were, for various reasons, some through inadvertance excluded from the alternate treatment.
- (2). That the serum treatment was neither always begun in proper time nor continued regularly.
- (3). That the doses were insufficient, the average quantity of serum used for a patient having been 55 c.c. against 100 c.c., as given in the instructions.
- (4). That the total quantity of serum put down as having been injected was in excess of that actually supplied to the hospital.

It appeared, therefore, that the alternation was frequently and arbitrarily interfered with at the Modikhana Hospital; that the serum was administered in a manner and in doses by which curative results could not be expected, and that the registration of important items was defective. The proofs for these facts and the conclusions drawn from the facts were submitted to Lieutenant-Colonel J. S. Wilkins, Special Medical Officer, Plague Operations, who, after examination, concurred in the opinion that the experiments, as conducted at the Modikhana Hospital, were valueless and not to be included in the statistics of the alternate treatment.

Six patients were treated with the serum at the Parsee Fever Hospital by Dr. S. Nariman, the Medical Officer in charge of it, two of whom recovered. Eight patients, treated during the same period without serum, had also two recoveries. Dr. S. Nariman stated that all the cases were equally severe, and added that from the few observations he can infer with certainty that the serum treatment prolongs life.

Ten patients were treated in private practice and had four recoveries. Except one, the cases were all of the third or fourth day of illness and all were very severe.

After having rendered a full account of the patients treated during the last official year, we shall bring in conclusion the statistics of the serum treatment since March, 1898, except those of the Modikhana Hospital, and also other records necessary for comparison.

Period.	Hospitals and private practice.	Treatment.	Number of patients.	Died.	Recovered.	Percentage of mortality.
March 1898 to 31st of October 1898 and 1st February to 31st April 1899.	Arthur Road Hospital.	Serum treatment, selected patients.	380	234	146	61.57
		Ordinary treatment, remaining patients.	1,167	942	225	80.71
	Maratha Hospital.	Ordinary treatment ...	3,257	2,636	621	80.93
1st of November 1898 to 31st January 1899.	Arthur Road Hospital.	Ordinary treatment, no serum available.	273	222	51	81.31
	Maratha Hospital.	Ordinary treatment ...	557	453	104	81.32
1st of May 1899 to 31st of June 1900 (June 1899 excluded).	Arthur Road Hospital.	Alternate treatment, serum patients.	480	328	152	68.33
		Alternate treatment, control patients.	480	382	98	79.58
1st of May 1899 to 31st of May 1900 (June 1899 excluded).	Maratha Hospital.	Ordinary treatment ...	2,599	2,104	495	80.95
13th of March 1898 to 31st of June 1900.	Different hospitals	Serum treatment, partly selected patients.	50	33	17	66.00
	Private practice...	Serum treatment, not selected patients.	42	19	23	45.23

From the table it appears that on the whole 952 patients were treated with the serum, and that the results have been uniformly in its favour. If we compare those during the periods of the selection and alternation we find a difference of 7 per cent. Does that prove a diminished efficacy in the second instance? Not necessarily so. No direct comparison between the results is possible. The mortality in the alternately treated cases is the average mortality which may be obtained by the serum treatment, whereas that in the selected cases is a minimum mortality. A comparison is only possible between the total mortality of the hospital during the periods of the selection and alternation. This comparison shows that the total mortality of the hospital was 1.36 per cent. lower during the second period. From this and from the small difference between the mortality in the selected cases and in those alternately treated and from the clinical observation, we are convinced that the treatment as practised during the period of the selection would not have given a reduction of 11.25 per cent. if the cases had been treated alternately. This is not due to an improved manufacture, but to the progress

made in the administration of the serum. The possibilities in this direction, apart from the intravenous injections, are by no means exhausted. We admit that partly out of imposed economy the doses have not been pushed for some time past as far as might have been done with advantage, as further experience has taught us. It is certain that with larger doses more cures could have been effected. Moreover, the serum was usually injected in repeated small doses, whereas in all probability one large dose would have been more effective. It might turn out that the first dose, necessarily a large one, decides the question of life or death, and that the subsequent doses are of little value. But experience, where human life is concerned, is not gained so quickly as in the laboratory. Still the increase of the doses can only be a stopgap, until improvement is made in the manufacture of the serum which must be the task of the future. That the task is not an impossible one, probably nobody doubts. What we may hope for from an improved manufacture and application of the serum has already been alluded to in our previous report. The results in private practice will depend on the promptness with which the public and the practitioners will avail themselves of the remedy. The chief responsibility rests with the latter who must be quick with the diagnosis and therapy. The germs of the disease double their number in half-an-hour; there is not a minute to be wasted. Better to inject 100 patients erroneously, who are not sick with plague, than to miss the injection in one who is suffering from it. Unfortunately the probability of a faulty diagnosis is infinitesimal. *In time of an epidemic every swollen and tender gland which cannot be accounted for by other obvious causes must be looked upon as a manifestation of the plague.* The same axiom holds good during epidemics generally with regard to the characteristic symptom of an infection, why, therefore, should it be otherwise in the case of plague? To delay the treatment until the case turns out to be severe would be even worse than to lose time with the diagnosis. When a man is struggling with the waves, who would wait in going to the rescue until he is sinking? In our hospitals, where 50 per cent. of the patients die within 48 hours after admission, the limit of our expectations is more restricted than in private practice.

Notwithstanding the lesson of modesty the plague has taught us with regard to "stamping it out" by sanitary measures, there may still be some who are as yet unwilling to draw the obvious inference also with respect to the curative efforts, and who view with scanty satisfaction the promise we are holding out and esteem slightly the results we offer. Only 11 per cent.! Could it be that such contempt is prompted by the comparison with the results obtained by the serum treatment in other diseases? There is only one disease in which the efficacy of serotherapy has remained undisputed, although it has been claimed for many. What then are the results in diphtheria? We have at hand the latest statistics of the Metropolitan Asylums Board, based on many thousands of observations, which give the mortality from diphtheria at 30 per cent. previous to the serum treatment and at 18 per cent. after its introduction. Only 12 per cent.! And to obtain this the most eminent scientists have been working in the best equipped laboratories for nearly a decade. Yet the results are considered as highly satisfactory and the serum has become a remedy, the public and the physician would be loath to be without. The percentage of the cures is the same in diphtheria and plague, but what a difference of the conditions under which it has been obtained! There the accumulated experience of the whole scientific world, unlimited means, selected horses, selected serum, the public fully aware that time is life, the patients with healthy organs, the disease of relatively slow course and with a mortality of only 30 per cent! Against it here, manufacture and treatment on their trial, the horses selected with regard to their cost, the serum used regardless of its strength, the patients of the lowest classes in an advanced stage of the disease, their vital power undermined by previous or

concurring illness, the disease of a fatal rapidity and with a mortality of 80 per cent. ! Truly it is the case of two vessels, the one steaming in smooth waters and with a favourable breeze, and the other against a hurricane and heavy seas, yet both make the same headway ; but can there be any doubt which one has the more powerful engines ? We see we are wrong, it cannot be the comparison with the results in other diseases that makes our 11 per cent. not acceptable. Then perhaps the costs are out of proportion to the gain ? Although to the humanitarian such a consideration might be repulsive, we cannot overlook the fact that in practice this must carry weight, and we think it not without advantage to discuss the matter from this point of view.

With the manufacture of the serum, as with any other manufacture, the cost decreases when the output rises. The cost of the experiments were necessarily disproportionately larger than the manufacture on an adequate scale would be. Moreover, the cost could be considerably reduced if only suitable patients be treated and a charge be made for the serum in those cases where the patients can afford it. We think the last point of importance also, because the charge would do away with the impression that the serum is still on its trial. Provided the above conditions be fulfilled the costs of the manufacture of the serum will not be out of proportion to the gain, and we can safely say that the results of the serum treatment of plague, as they are at present, will be acceptable also from a pecuniary standpoint.

That these results have been obtained in a relatively short time and under difficult circumstances is first of all due to the liberality and perseverance of the Municipality and the help of the Government of Bombay who provided the means for the manufacture of the serum, and to the insight of their advisers, who, in spite of adverse criticism, never lost confidence in, or interfered with, the conduct of the experiments. We may be allowed to mention specially Mr. W. L. Harvey, I. C. S., the Municipal Commissioner, who was ever ready to meet our requirements, and to him we are moreover much indebted personally for the kind indulgence he has always shown to us, little versed as we were in language and official ways. It is due to the steady support of the late Health Officer of Bombay, Col. T. S. Weir, I.M.S., who has also the merit of having done his best for the introduction of the prophylactic treatment of plague, and to the assistance of Lieut.-Col. J. S. Wilkins, I.M.S., D.S.O., Special Medical Officer, Plague Operations, one amongst the few of the medical profession who thought it incumbent to form an opinion based on personal experience. It is due to the untiring energy of Khan Bahadur N. H. Choksy, M.D., *Hon. Causa.* of Freiburg, on whom the treatment with the serum devolved. Three qualities fitted him best for the task entrusted to him : his unique experience of plague, his interest in the experiments, and the scientific spirit in which he approached the problem. Although an advocate of the treatment, he was always critical, ever on his guard against self-deception and errors. He has well deserved the satisfaction of the success after the two years' arduous work. We take here the opportunity to tender our hearty thanks to Dr. Choksy for his invaluable collaboration and to his assistants, Dr. D. S. Fraser and Dr. D. C. Setna, and the whole staff of the Arthur Road Hospital for the zeal with which they carried out their duties in connection with the serum treatment. Our thanks are also to all those who have taken interest in, or given aid to, the serum treatment and whose names it would take too long to mention.

G. POLVERINI, M.D.

A. MEYER, M.D.

APPENDIX No. V.

Bacteriological Examination of Hospital Cases.

From the 6th December 1899 to the 16th of June 1900, 149 examinations were made into the cases of 105 patients. Of these examinations 36 were from plague cases, 63 for relapsing fever, 14 for malaria, 8 capsules were taken for serum diagnosis, 4 samples for leprosy and 24 for various other diseases. These examinations were carried out at the Plague Research Laboratory, Parel.

Plague.

36 examinations were made in plague cases, of which 12 were cultures from plague buboes, 13 were samples of pneumonic expectoration in plague, 4 were agar cultures of blood (taken by puncture of the skin), 5 were from plague carbuncles and sores and 2 cultures were from a small-pox case with buboes.

Of the 12 cultures from buboes, in 8 the plague bacilli were found, usually associated with organisms from the surface of the skin, or the cocci of commencing suppuration. One of those in which the bacilli were found was a case of *pestis ambulans* with hardly any symptoms besides the buboes. In 4 of the cultures the bacilli were not found; in 3 of these this was due to the pus organisms being present in great numbers; and in the other case I probably missed the gland, which was small. 2 cultures were made from a small-pox case which had buboes before and at the commencement of the small-pox eruption (A.R. 1539), but the plague bacillus was not present. The question, therefore, remained whether (or not) the bacilli had been present and had been killed by the presence of the small-pox virus.

In the 13 examinations of pneumonic expectoration, the pneumonococcus was found in all but the plague bacilli in only 3. This was probably due to the other organisms present killing the plague bacilli in the agar culture, as in "smear" preparations made from the same expectorations a bacillus was seen resembling the plague bacillus. The 4 cultures from blood were only attempted in very severe cases and in only one case was the bacillus found (A.R. 480) in a little girl with a temperature of 105.2, who died in a few hours. The blood was taken from the lobe of the ear.

Relapsing Fever.

Of the 63 examinations made from known or suspected cases of Relapsing Fever, 47 were blood samples, 8 were samples of blood and mucus from stools, and 8 were cultures from relapsing fever buboes.

Results :—Of the 47 blood samples the spirillum was found in 25 cases and not found in 22. In the cases in which the spirillum was not found 11 were doubtful cases and were probably not relapsing fever, but with the rest the blood was taken when the temperature was rising at the beginning of a relapse. These cases show the uncertainty of finding the spirillum even when most expected and in some cases in which it may have been found in a previous examination. The spirilla were found to be fairly numerous in the blood of epistaxis of relapsing fever. In 4 of the cases clumping of the spirilla was observed; this occurred just before the crisis. In cases where the spirilla were found in large numbers (say 8 to 10 or more in a field) a fatal issue has followed. The number of spirilla has, as a rule, no relation to the temperature observed, *e.g.*, in one case (A.R. 1318) a very few spirilla were found with a temperature of 106° 4. Another case which illustrates well the want of relation between the temperature and the presence of spirilla was (A.R. 2817) where

I failed to find a single spirillum with a temperature of 105° on the first day of relapse. In some cases with buboes the spirilla were found in large numbers, *e.g.*, (A.R.1596) and (Mar. 3670).

In the 8 examinations of blood and mucus from relapsing fever stools (slide smears and agar cultures) I failed to find the spirillum. On culture the *bacillus coli communis* was constant, the occasional organisms being other bacilli, cocci, yeasts, &c.

Relapsing Fever Buboes—8 cultures were made from the 5 most typical cases met with. In no case was any bacillus found. 6 of the cultures were absolutely sterile; in the other 2 cases a few pus cocci were found; in one case (Mar. 3403) the surface of the skin over the bubo had been burnt with the "marking nut" and the pipette probably touched the skin in taking the culture. The bubo did not suppurate. The other case (M.K.6664) had a large indurated bubo over, but not involving, the parotid, exactly resembling a plague bubo. A few staphylo cocci were found (*pyogenes aureus* and *citreus*), but the greater part of the agar surface was devoid of growth. This bubo subsequently suppurated freely. This patient had three attacks (or relapses), each ending with crisis, the temperatures rising respectively to 104° , 103° and $102^{\circ}\cdot6$.

Note.—Relapsing fever with buboes is no new thing. In one epidemic in Russia, buboes were so prevalent that the cases were at first diagnosed as plague and the same thing happened on the outbreak of the present epidemic in Bombay prison where the difficulty of diagnosis was greater, owing to the presence of both diseases amongst the community. During the major part of the present epidemic these buboes were rare, forming only (roughly) 3 per cent. of the cases admitted into the Maratha Hospital. For an inspection of the figures I am indebted to the courtesy of Dr. Dhargalker. The distribution of the buboes is much the same as in plague; but, as a rule (to which there are exceptions), they are smaller and more numerous.

Summarising the results obtained in these examinations of relapsing fever (but remembering the limitation of the numbers) we find:—

1. The temperature gives no indication of the number of spirilla present.
2. Clumping together of the spirilla indicates the approach of crisis.
3. A large number of spirilla found indicates a probable fatal issue to the case.
4. Few or no spirilla found gives no indication of the severity of the case.
5. Spirilla were found in the blood of epistaxis, but not in blood from stools.
6. The buboes of relapsing fever cases examined did not contain bacilli and were usually sterile.

Serum Diagnosis.

8 blood capsules were taken for the purpose of serum diagnosis. In the case of a Brahmin at the Colaba Hospital the Malta fever reaction was obtained on the 21st of February. In another case (Mar. 785) an incomplete Malta fever reaction was obtained, meaning that the patient may have had Malta fever in the past but not in the present illness. A little boy (Mar. 3492) gave the typhoid reaction. Two other cases having the temperature curve, diarrhoea, &c., resembling typhoid did not give any reaction; these were adults. The other 3 cases did not give any reaction.

Malaria.—14 examinations of blood were made for malaria, which, however, was only found in 2 cases, and whether due to the dry season or not malaria did not appear to be prevalent amongst the hospital cases. Most of the cases were examined on the principle of "Diagnosis by exclusion," and several were thus traced to their cause; of these causes tuberculosis appeared to be the most common. One case was abscess of the lung and in one or two other cases simple abscesses formed.

Leprosy.

There were only four examinations made for leprosy amongst three patients. A sample was taken from a tubercle and one from the nasal secretions, both of which were successful. The latter success was interesting as the existence of leprosy bacilli in the nasal secretions is a comparatively recent discovery, and further it has been suggested that this is the usual mode of entrance into the system. The other cases were doubtful and did not show the bacillus.

Varice.

24 examinations were made from patients with various other diseases, *e.g.*, a sailor (M.K.6235) was sent to hospital as plague with an enlarged gland near the left angle of the jaw due to the "irritation" of a gum boil. This gland was sterile. Amongst the cases were catarrhal pneumonia, bronchitis, diarrhoea, &c., examined for various reasons, but generally to clear up any doubt as to their infectious nature.

In the above notes A. B. stands for the Arthur Road Hospital.

M. K. " " the Modikhana "

Mar. " " the Maratha "

The numbers given are the Hospital numbers of the cases cited.

GEORGE TAYLOR.

APPENDIX No. VI.

FROM

ASSISTANT HOSPITAL VISITOR,

TO

SPECIAL MEDICAL OFFICER

TO THE PLAGUE COMMISSIONER,

BOMBAY PRESIDENCY.

Report of Assistant Hospital Visitor, Plague Epidemic, 1899-1900.

1. My duties as the Assistant Hospital Visitor were commenced on December 13th, 1899, and ceased on June 13th, 1900.

The duties consisted in visiting the private plague hospitals.

At these visits there was to be no interference with the treatment of cases, but the attention was to be confined to the sanitary state of the hospital.

The daily returns sent in by the private plague hospitals were to be checked.

2. List of private plague hospitals visited—

Parsee, Parel Road.

Do. Supplementary Ward, Frere Road.

H. H. Aga Khan's, Dontad Cross Lane.

Port Trust, Frere Road.

Adamjee Peerbhoy, Queen's Road.

Pathare Prabhu, Charni Gardens.

Khatri, Bapu Khote Street.

Brahmo Kshatriya, Pinjrapole Lane, Bhuleshwar.

Kapole and Lad, Frere Road.

Bhatia, Frere Road.

Thakordwar, Lohana.

Telegu, Kamatipura.

3rd Bhoiwada, Bhuleshwar.

Jain, Parel Road.

Do. Pinjrapole, Bhuleshwar.

Bene Israel, Victoria Gardens.

Marwari and Futtipura, 2nd Pinjrapole Lane, Bhuleshwar.

Islami Nagdevi, Nagdevi Street.

Petit Mills.

Empress Mills, DeLisle Road.

Narielwadi Mahomedan Hospital.

Cutch Lohana, Clive Road.

Mogul, Baboola Tank.

V. S. Maharajah's Servants, Cathedral Street, Bhuleshwar.

Sarvajanic, Government House Grounds, Parel.

Stewart Strong's, Colaba.

Hindoo Fever, Charni Gardens.

3. When visiting a hospital, its general sanitary condition was considered, while special attention was bestowed on the following points :—

- (a) The condition of the bedding, sheets, blankets and cloths of a patient.
- (b) The cleanliness of floors and walls.
- (c) The providing patients with spittoons and encouraging them, through the hospital assistants and ward-boys, to expectorate into these instead of promiscuously about on the bedding, floors and walls.
- (d) The limiting of the number of visitors to patients with a view to preventing more than two visitors at a time to each patient.
- (e) The calling the attention of the hospital assistants to dressings, &c., thrown about the floors or out of the windows.
- (f) The disinfection of bedding sheets and cloths used for the patients and of other articles likely to spread infection.

4. If there was any cause for complaint, remarks were written in a book kept at the hospital for the purpose. The remarks thus made were seen by the visiting physician or managing committee, while at my next visit I was able to refer to my note and ascertain if that particular matter had been put right.

5. In all cases of continued or gross defect in the management of the hospital the matter was reported to the Special Medical Officer.

6. Seeing that at these hospitals the patients were, in the great majority of cases, admitted for a contagious disease, thorough disinfection of all that might be likely to convey infection was, I considered, the most important point for consideration. When first I commenced visiting the private plague hospitals, I learnt from answers to questions I put to the hospital assistants that in many cases somewhat hazy ideas were held on the subject of disinfection.

In consequence of this, I drew up some suggestions as to methods of disinfection, and, with the sanction of the Special Medical Officer, had a copy of these sent to each private plague hospital.

The following are the suggestions which were sent round :—

Very few of the private hospitals made use of the steam disinfectors, the reason apparently being the difficulty of transport. If each steam sterilizing station were supplied with a cart that could be sent round to the private plague hospital in its vicinity and collect from these the things for disinfection, more use might be made of this method of disinfection.

7. Any suggestion made was in all cases productive of an effort on the part of the hospital to carry it into effect.

8. The following are some remarks about the different hospitals :—

- (a) The Empress Mills (DeLisle Road), the Supplementary Parsee Ward (Frere Road), the Marwari and Futtipura (2nd Pinjrapole Lane, Buleshwar), require better direct supervision.
- (b) There is room for considerable improvement in the Narielwadi Mahomedan and V. S. Maharajah's Servants' Hospitals.
- (c) The following hospitals should be re-opened on new sites :—

Telegu.	Thakordwar Lohana.
Brahmo Kshatrya.	Cutch Lohana.
Aga Khan's.	Islami Nagdevi.
3rd Bhoiwada.	Mogul.
- (d) The Bapu Khote and Petit Mills Hospitals I never found containing patients : the former, I think, ought to re-open on a new site ; the latter should be an excellent little hospital from its appearance.
- (e) The remaining hospitals are, I think, sufficiently suitably situated. All of them were well managed, but the number of patients treated at the different hospitals varied considerably.
- (f) Especial praise is, I think, due to the Hindu Fever Hospital, the Sarvajanic Hospital and the Stewart Strong's Hospital, Colaba.
- (g) Three of the Municipal Hospitals were also visited, *viz.*, the Mahim, the General Mahomedan (Northbrook Gardens) and the Zullai Sunni (Ripon Road); the last of these was visited twice a week for the purpose of discharging patients.

9. As regards the advisability of the existence of private plague hospitals, my opinion is at present the following :—

So long as a community that maintains a private hospital is ready to receive advice which they are willing and able to efficiently carry into effect, and provided the hospital be suitably situated, a private plague hospital is a means of checking the spread of infection and a service to its particular caste or community, for the many points of infection are brought to a focus, as it were, at one point, and the infection is here smothered.

When, however, advice given is not, or cannot be, efficiently carried into effect, the result is the removal of infection from one locality to another without its being smothered at the latter.

Therefore, encourage the starting and carrying on of such private plague hospitals, as are both willing and able to efficiently follow the advice given.

10. It remains to be seen whether those living in the vicinity of plague hospitals are more subject to infection than others not so placed. The part played by rats in the spreading of plague infection makes one think that such a thing is possible and even likely. The reports of the various District Plague Officers might throw some light on this matter.

I have the honor to remain,

Your most obedient Servant,

E. L. HUNT,

At present Inspector of Inoculation,

Formerly Assistant Hospital Visitor.

METHODS OF DISINFECTION.

Suggestions to medical officers in charge of private plague hospitals, Bombay.

(Sd.) E. L. HUNT,
Assistant Hospital Visitor.

DISINFECTION.

Clothing and Bedding.

1. All articles of little value, *burn*.
2. Bedding, Blankets, Clothing, Mattresses, (take out hair or wool or feathers, and loosen them before disinfecting) in Steam Sterilizer.
 - 1 steam sterilizer at Modikhana.
 - 1 „ „ „ Northbrook Gardens.
 - 1 „ „ „ Narielwadi.
 - 1 „ „ „ Arthur Road.
3. Failing (2), *burn*
4. Failing (2) and (3), boil for 1 hour and wash well with soap and water.
5. Failing (2), (3) and (4), soak for 24 hours in any of these
 - (1) Carbolic acid, 1 in 20.
 - (2) Izal „ 1 in 20.
 - (3) $\frac{1}{2}$ ounce perchloride of mercury.
1 ounce of hydrochloric acid in 480 ounces of water.

DISINFECTION.

Rooms and Furniture.

Fresh air and sunlight (open doors and windows and remove tiles if possible).
Lime-wash floors and walls.
Wash furniture with solution of phenyle or chloride of lime (1 in 100).

DISINFECTION.

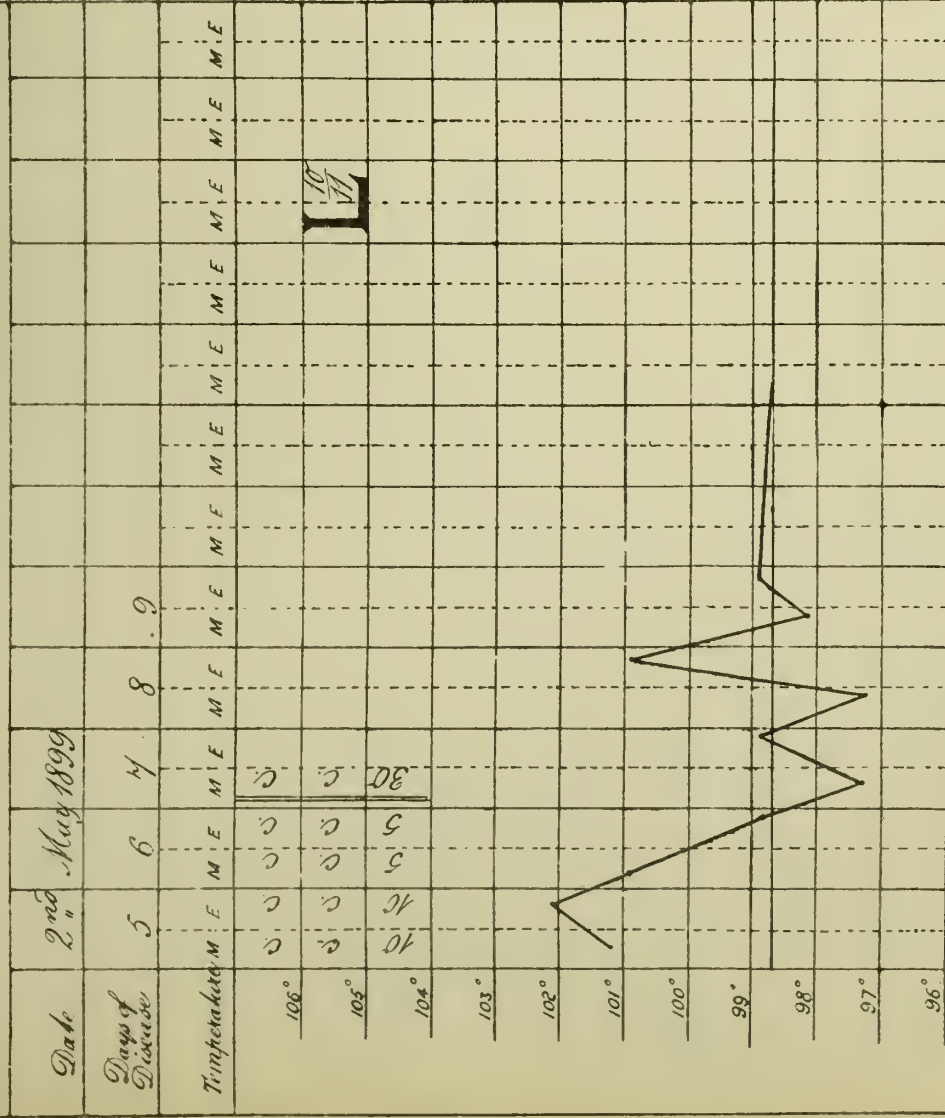
Excreta and Discharges.

(From bowels, bladder, lungs, abscesses, etc.)

1. Should be well mixed with 1 in 20 carbolic acid and left quarter of an hour and finally burnt or buried or thrown down closet which should be well flushed with water.

No. 2.

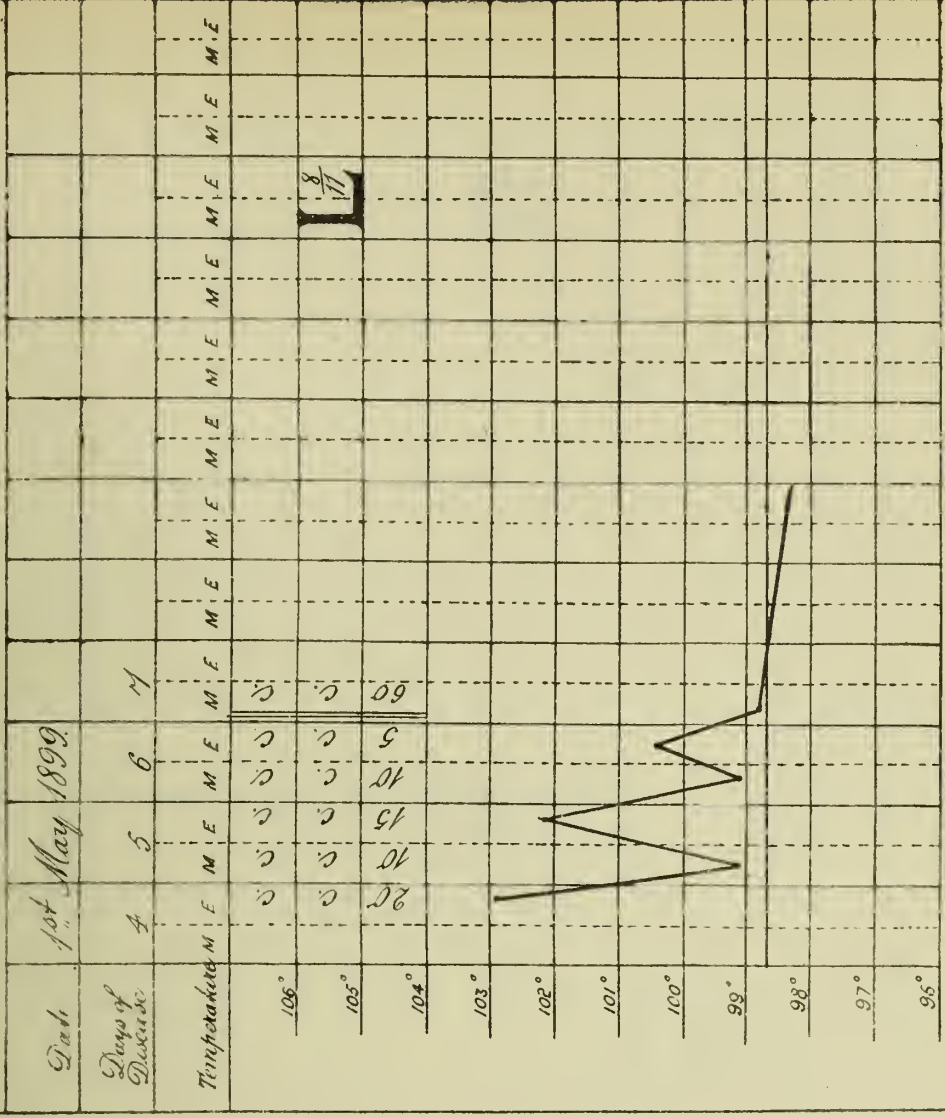
Hospital No. 1614 Diagnosis: Plague. Previous duration: 5 days
 Sex: Male, Age 6, Caste: Hindu, Occupation: Nil.



Position of Bubo: R. Axillary. Result: Discharged after 16 days.

No. 1

Hospital No. 1608 Diagnosis: Plague. Previous duration: 4 days
 Sex: Male, Age 35, Caste: Hindu, Occupation: Labourer.



Position of Bubo: L. Femoral, (Incised) Result: Discharged after 42 days.

C. M.

Hospital No.	Diagnosis:	Previous disease, & days
No. 1619	Plague	
Sex: Female, Age 28,	Castle Howard,	Occupation: Ml.

Date.	2 nd May 1899.															
Days of Disease.	4	5	6	7												
Temperature	M	E	M	E	M	E	M	E	M	E	M	E	M	E		
106°	C.	C.	C.	C.	C.	C.	C.	C.	C.	C.	C.	C.	C.	C.		
105°	C.	C.	C.	C.	C.	C.	C.	C.	C.	C.	C.	C.	C.	C.		
104°	15	15	10	10	10	10	10	10	10	10	10	10	10	10		
103°	103°	102°	101°	100°	99°	98°	97°	96°								

Position of Bubo: R. Inguinal.

*Result. Discharged after
33 days*

*Result: Discharged after
53 days.*

575

Hospital No. 1660 Diagnosis: Typhoid Previous duration: 8 days.

Six: Male, Age: 20, Caste: Hindu, Occupation: Barber,

[illegible]

Position of Bubo: R. Axillary (Incised)

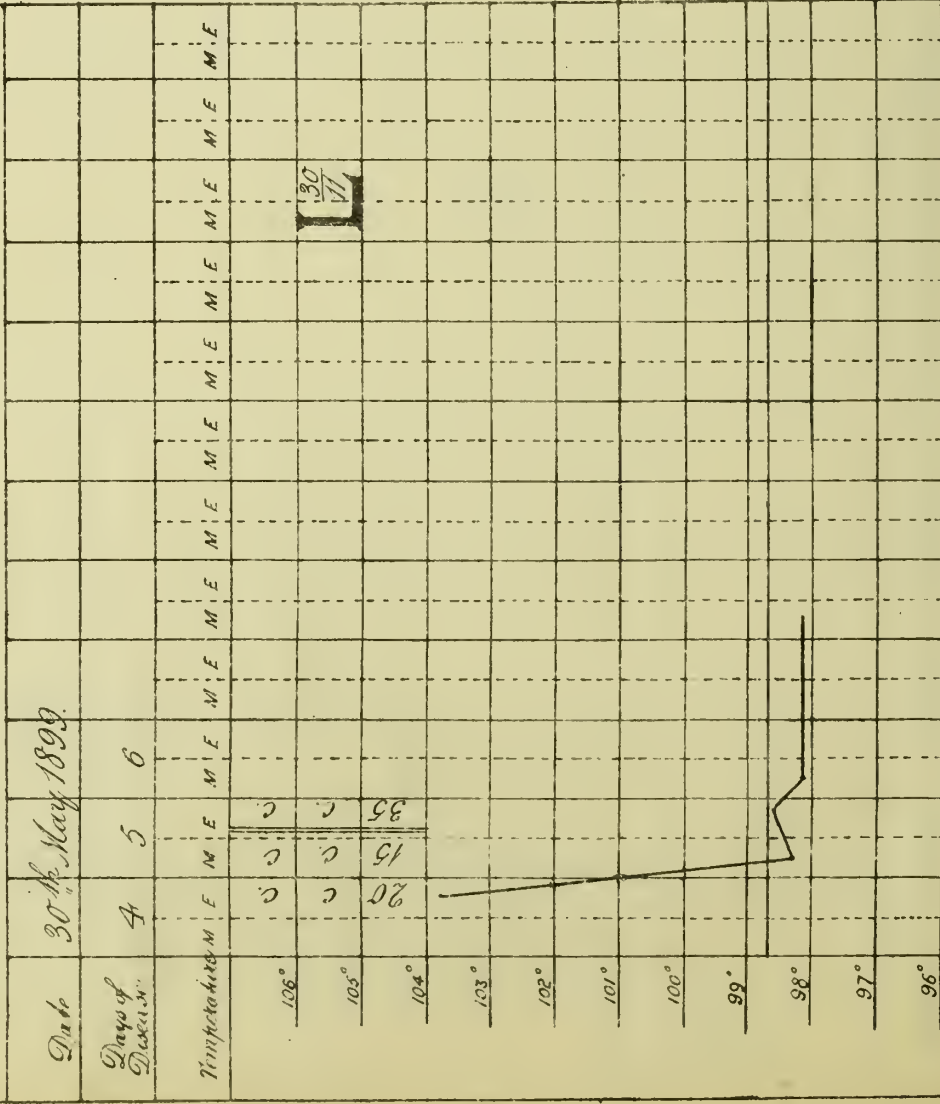
Discharged after
39 days.

[illegible]

No 8

Hospital No 1744. Diagnosis: Plague. Previous duration: 4 days.

Sex: Male, Age: 14, Caste: Hindu, Occupation: Nil.



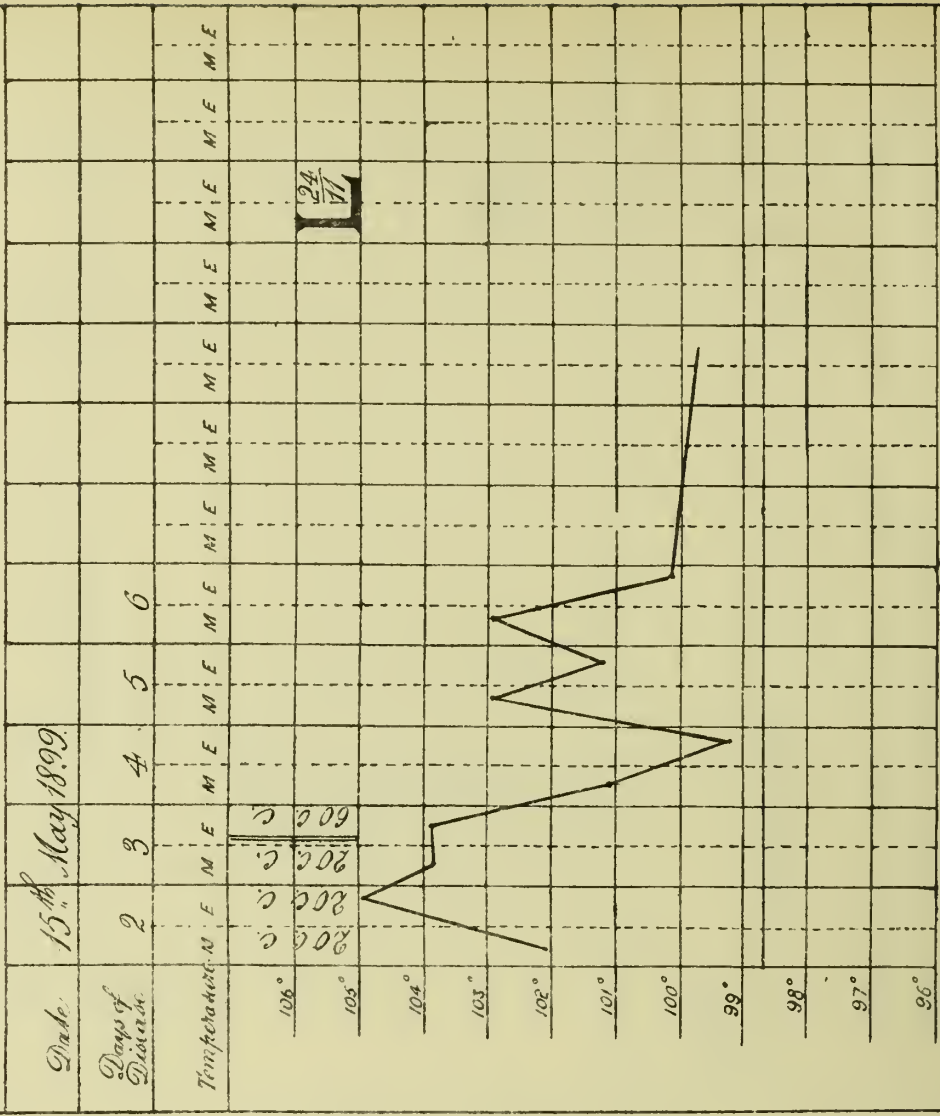
Position of Bubo: B. Femoral

Result: Discharged after 19 days

No 4

Hospital No 1688. Diagnosis: Plague. Previous duration: 2 days.

Sex: Female, Age: 30, Caste: Hindu, Occupation: Mill-hand.

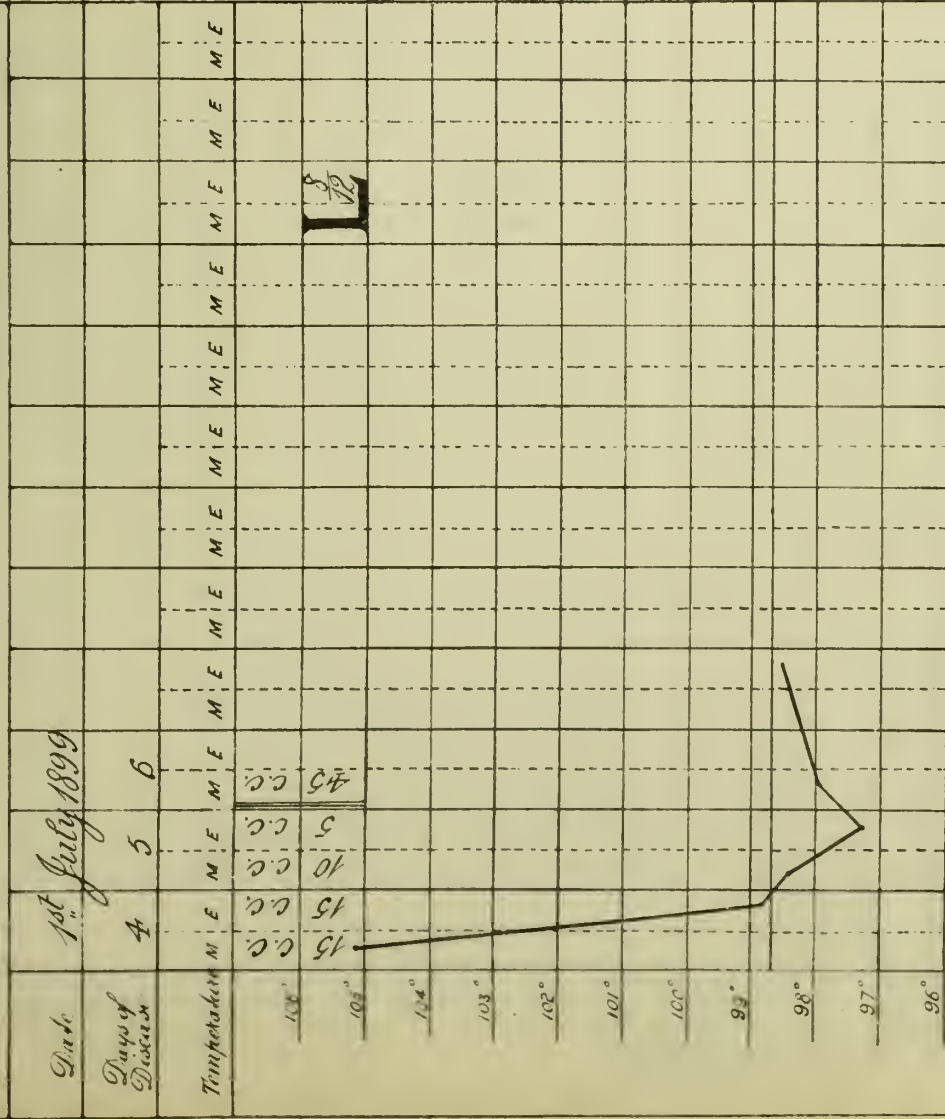


Position of Bubo: B. Cervical

Result: Discharged after 40 days

N^o 10

Hospital No. 1829 Diagnosis: Plague. Previous duration, 4 days.
 Sex: Female, Age: 8, Caste: Hindu, Occupation: Nil.

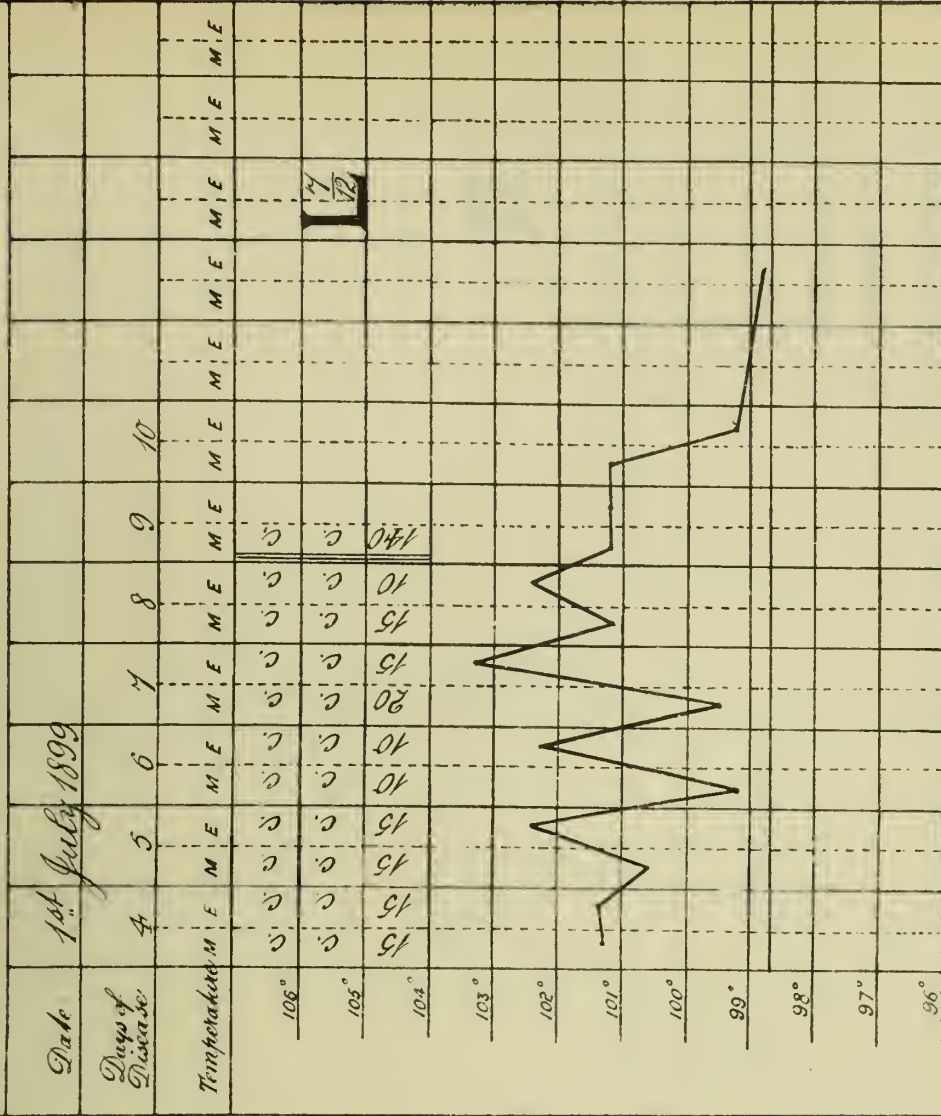


Position of Bubo: R Inguinal.

Result: Discharged after 36 days.

N^o 9

Hospital No. 1825 Diagnosis: Plague. Previous duration, 4 days.
 Sex: Female, Age: 13, Caste: Hindu, Occupation: Nil.

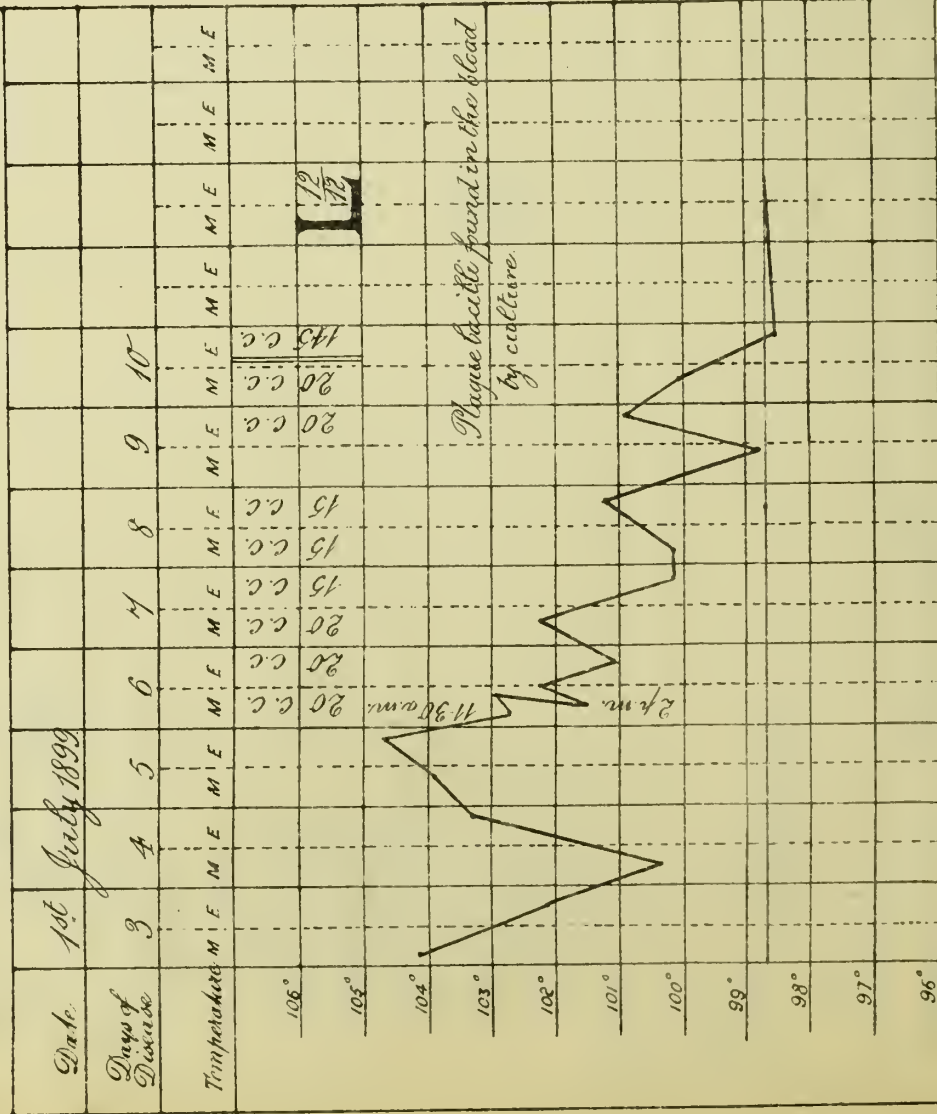


Position of Bubo: R. Axillary (Incised)

Result: Discharged after 58 days

No 12

Hospital No. 1824. Diagnosis: Plague. Previous duration, 3 days.
 Sex: Male, Age: 30, Caste: Hindu, Occupation: Labourer.

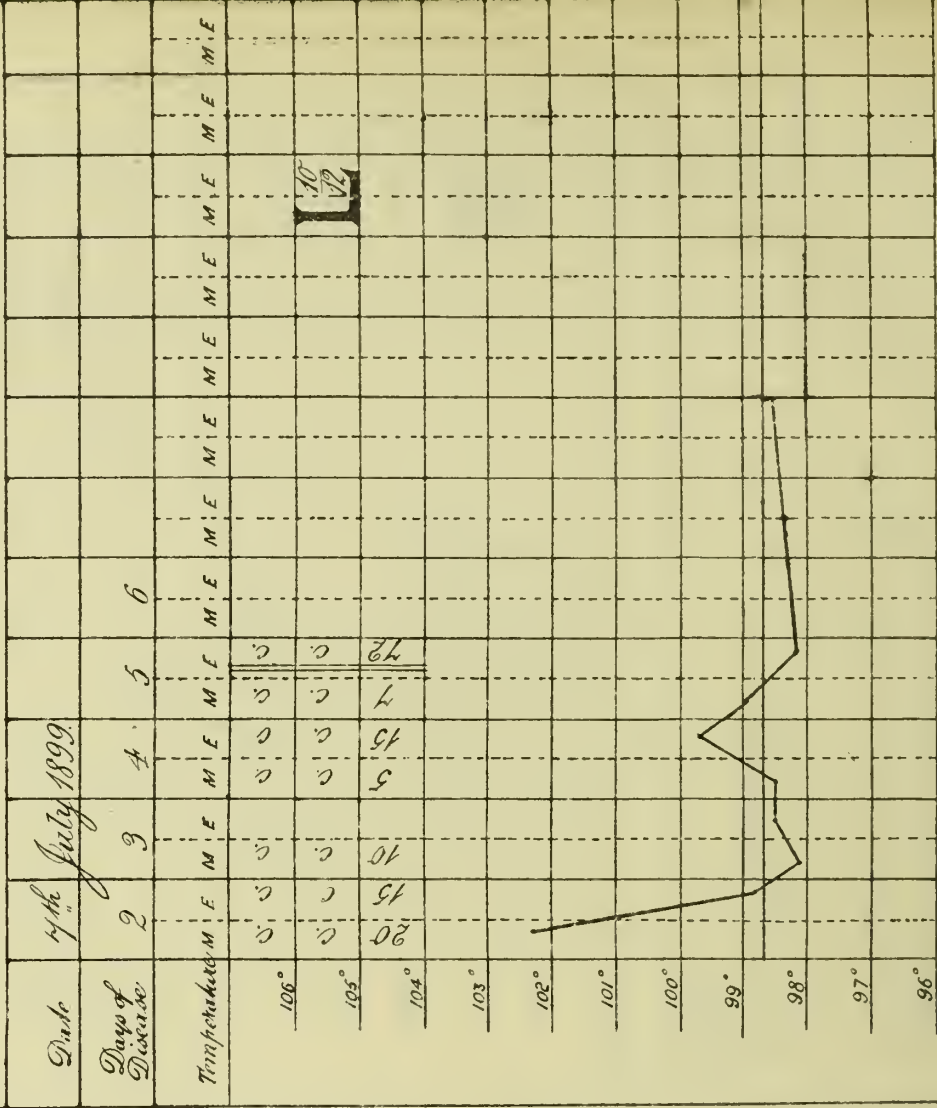


Position of Bubo: No bubo. No pneumonia.

Result: Discharged after 23 days

No 11

Hospital No. 1843. Diagnosis: Plague. Previous duration, 2 days.
 Sex: Male, Age: 12, Caste: N. Christian Occupation: N.L.



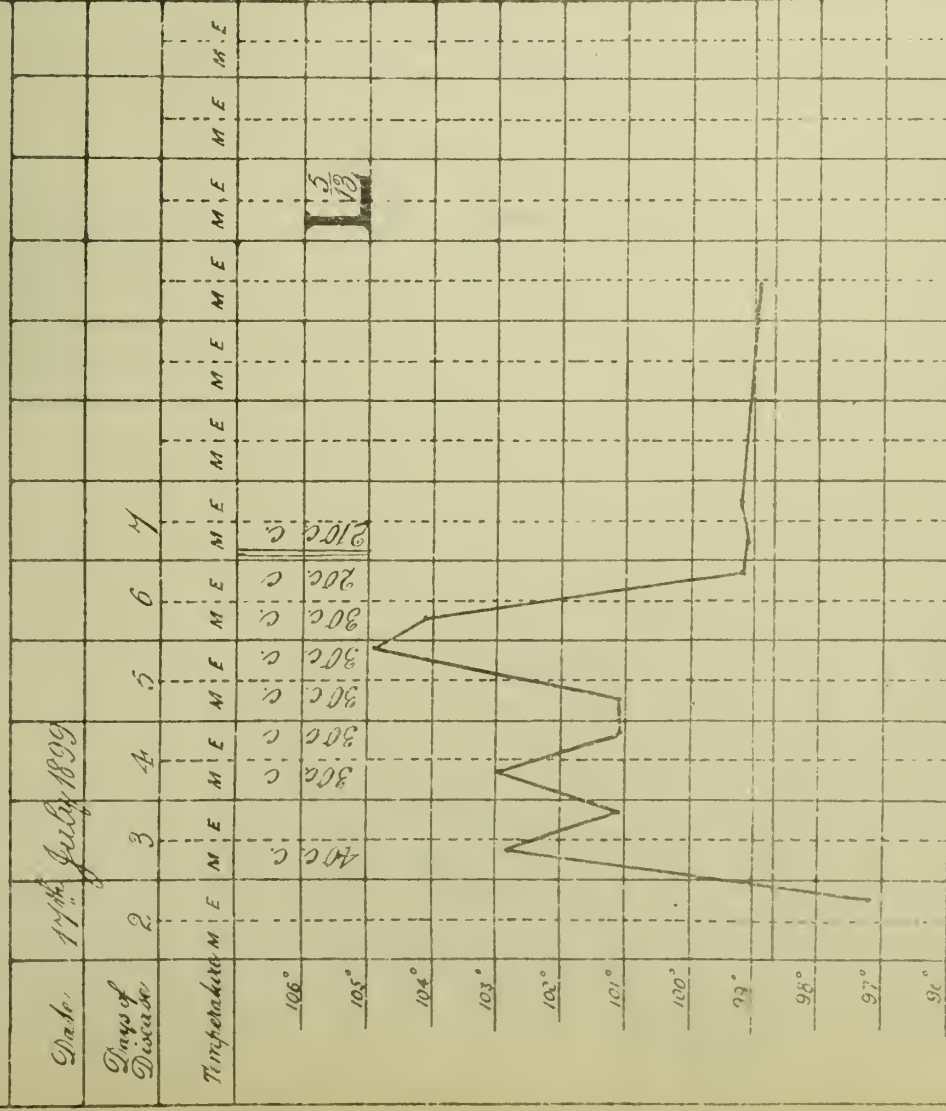
Position of Bubo: L. Inguinal and iliac

Result: Discharged after 24 days

No. 44

Hospital No. 1880 Diagnosis: Plague. Previous duration: 2 days

Sex: Female, Age: 35, Caste: Hindu, Occupation: Nil



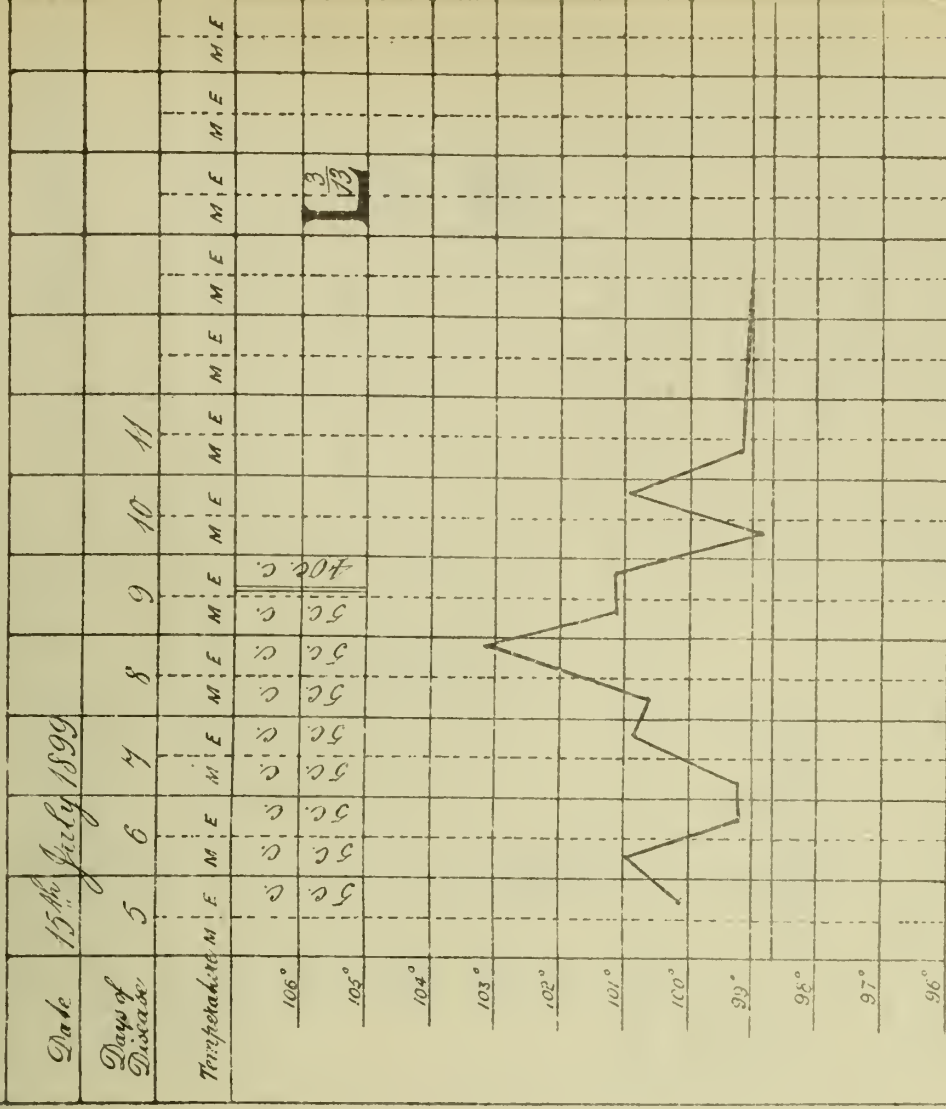
Position of Bubo: L. Femoral.

Result: Discharged after 13 days.

No. 13

Hospital No. 1868 Diagnosis: Plague Previous duration: 5 days

Sex: Male, Age: 3, Caste: Hindu, Occupation: Nil

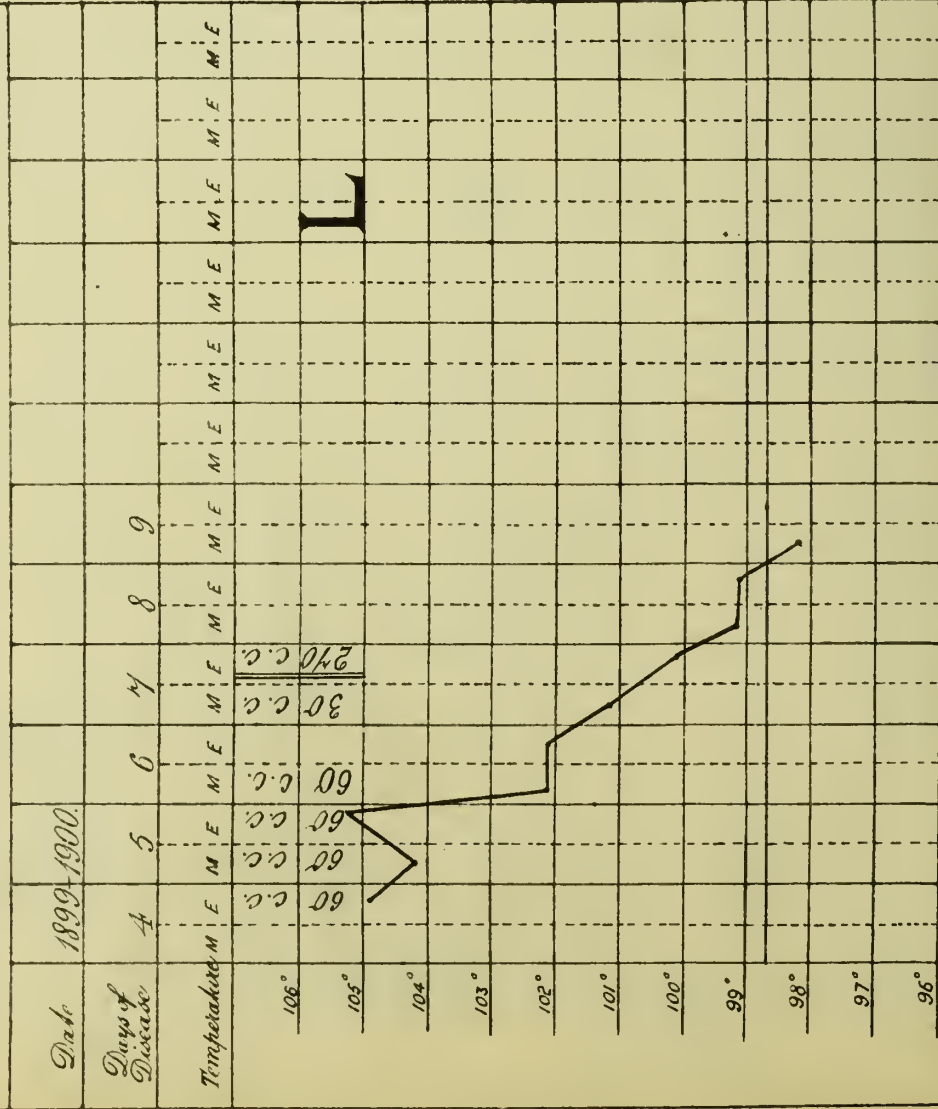


Position of Bubo: L. Femoral.

Result: Discharged after 13 days.

No 16

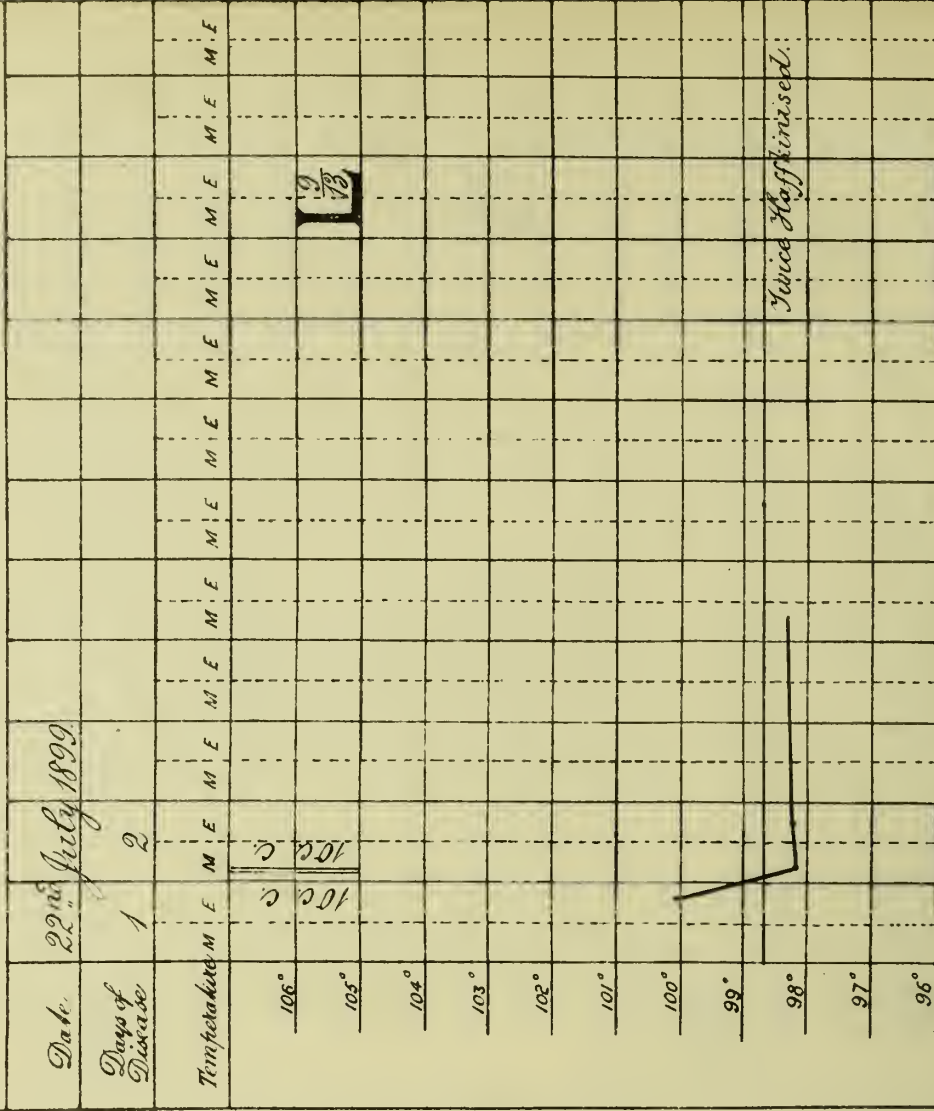
Private patient. Diagnosis: Plague. Previous duration: 4 days.
Sex: Male, Age: 42, Caste: Parsee, Occupation: Merchant.



Position of Bubo: Double sub-maxillary, Double cervical, Result: Cured.
and infiltration round the neck.

No 15

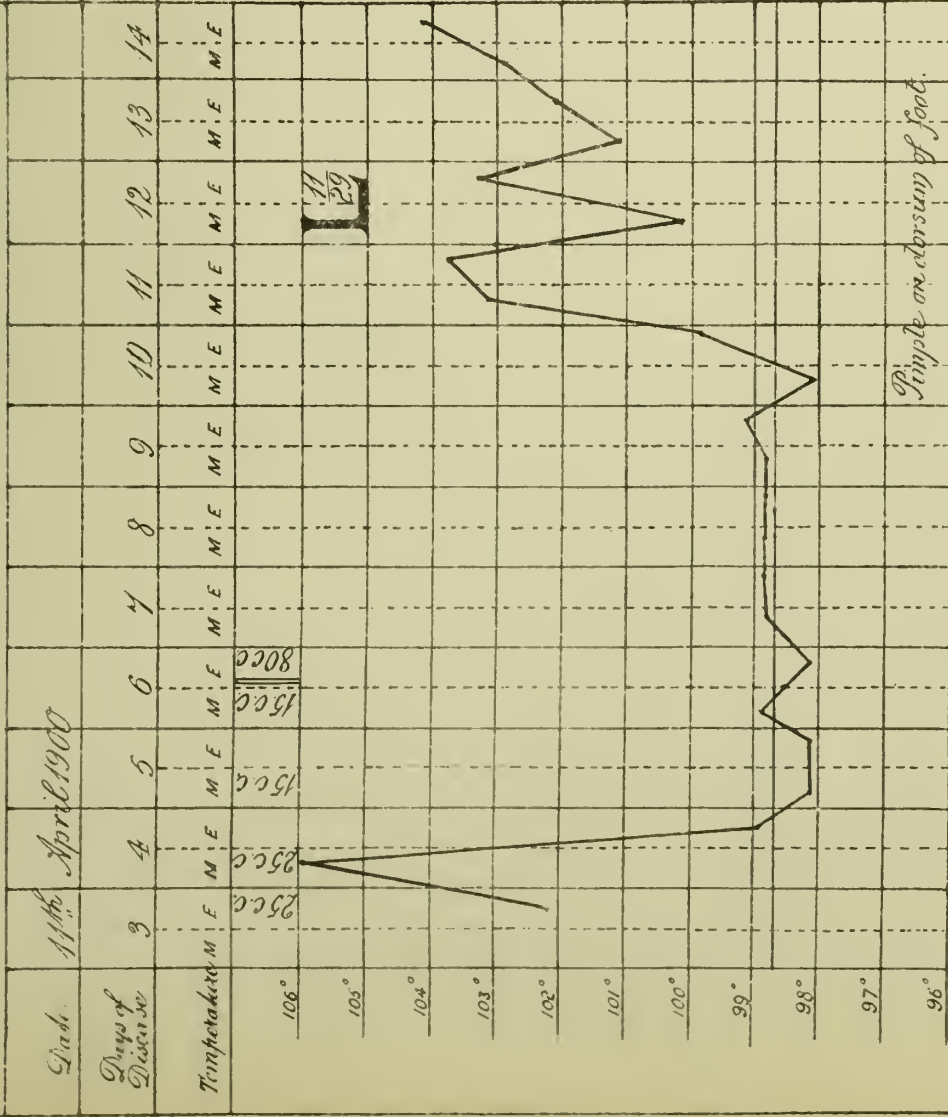
Hospital No 1894. Diagnosis: Plague. Previous duration: 1 day
Sex: Male, Age: 10, Caste: N. Christian, Occupation: School boy.



Position of Bubo: L. Femoral and Inguinal. Result: Discharged after 9 days.
Twice Hoffmannised.

No 18

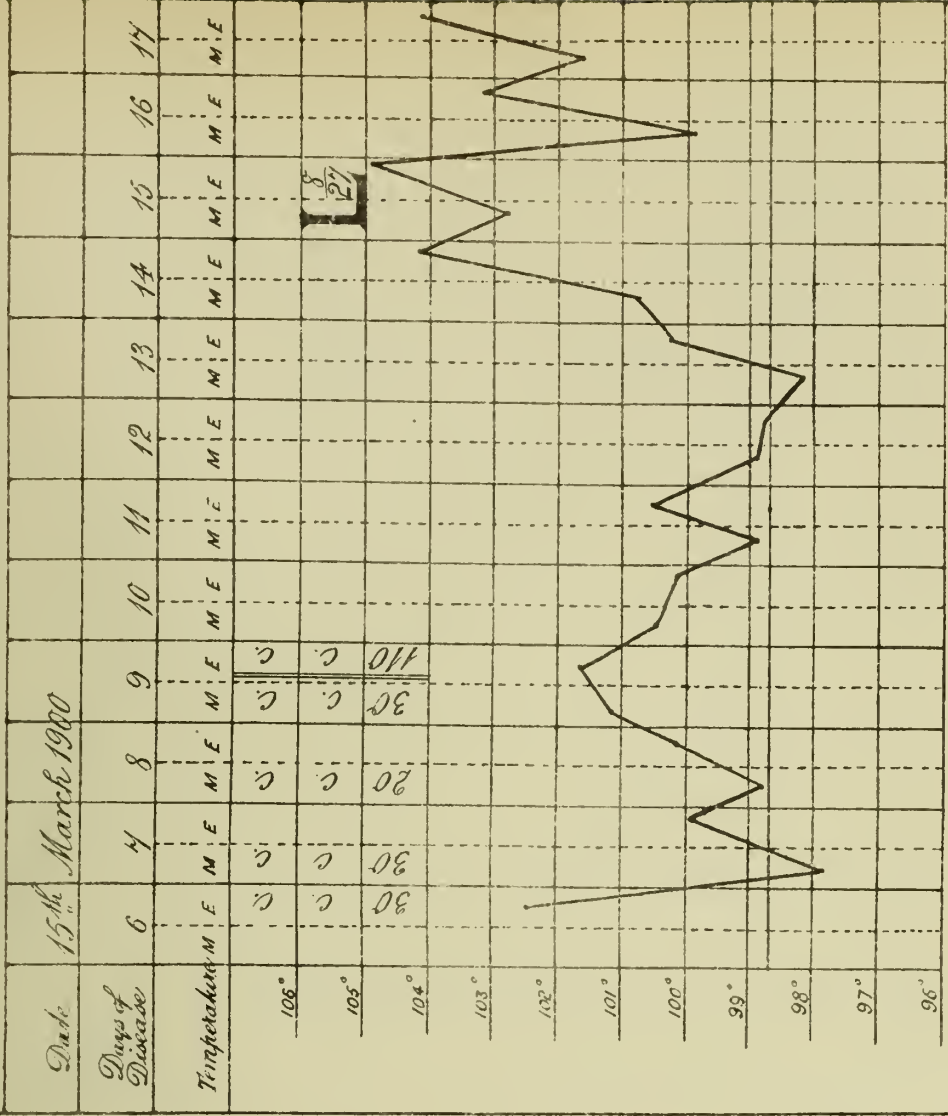
Hospital No: 2032. Diagnosis: Plague and relapsing fever. Previous duration: 3 days.
 Sex: Male, Age: 40, Caste: Mussatman, Occupation: Mtl.



Position of Bub: R. Femoral and Ilac. Result: Died

No 17

Hospital No: 1596. Diagnosis: Plague and relapsing fever. Previous duration: 6 days.
 Sex: Female, Age: 25, Caste: Hindu, Occupation: Laborer.



Position of Bub: R. Axillary. Result: Died

187

Hospital No 4615. Diagnosis: Plague. Previous duration: 5 days

Sex: Male, Age: 33, Caste: Hindu, Occupation: Labourer.

[illegible]

Position of Butto: R. Femoral.

*Result: Discharged after
52 days.*

luminous

No. 5

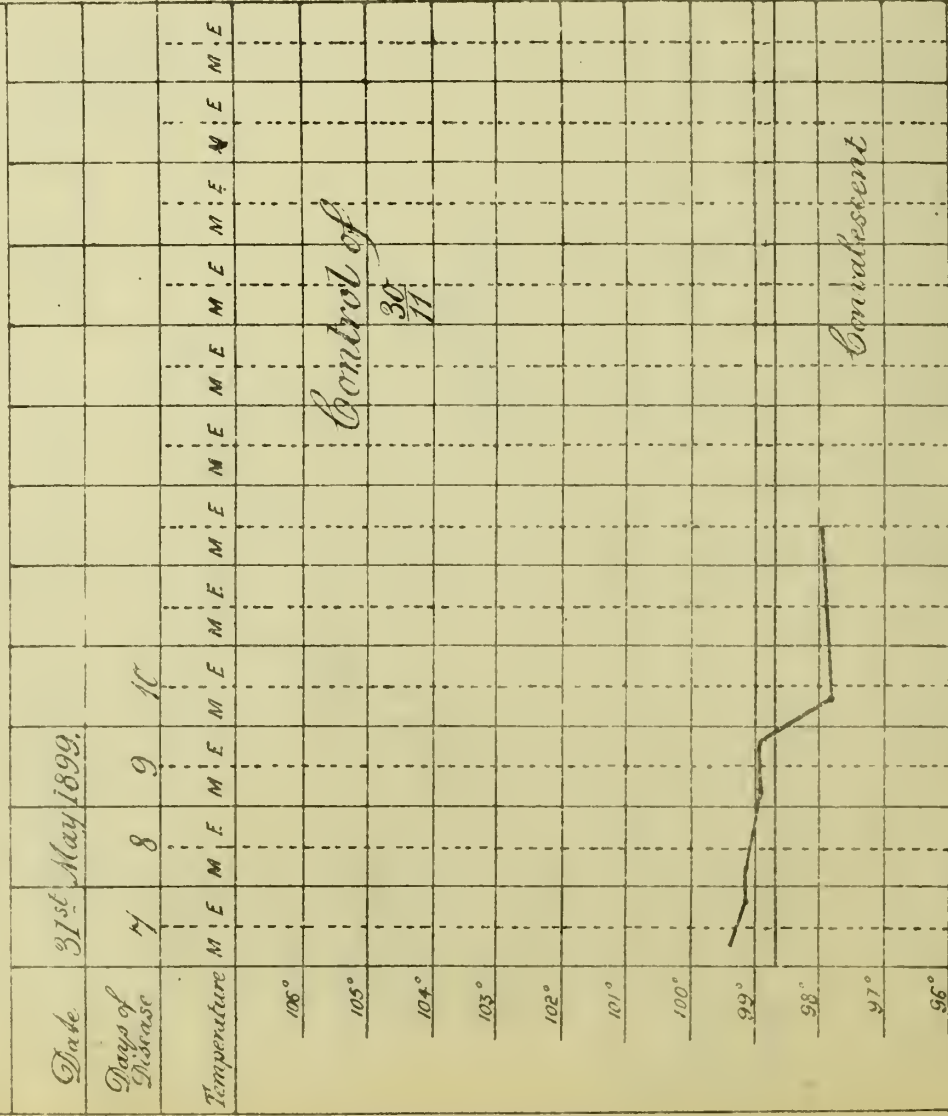
Hospital No 1674 Diagnosis: Plague. Previous duration: 9 days.
Sex: Male, Age: 22, Caste: N. Christian, Occupation: Fitter.

[illegible]

Position of Bubo: R. Inguinal.
Result: Discharged after
35 days.

N^o 8

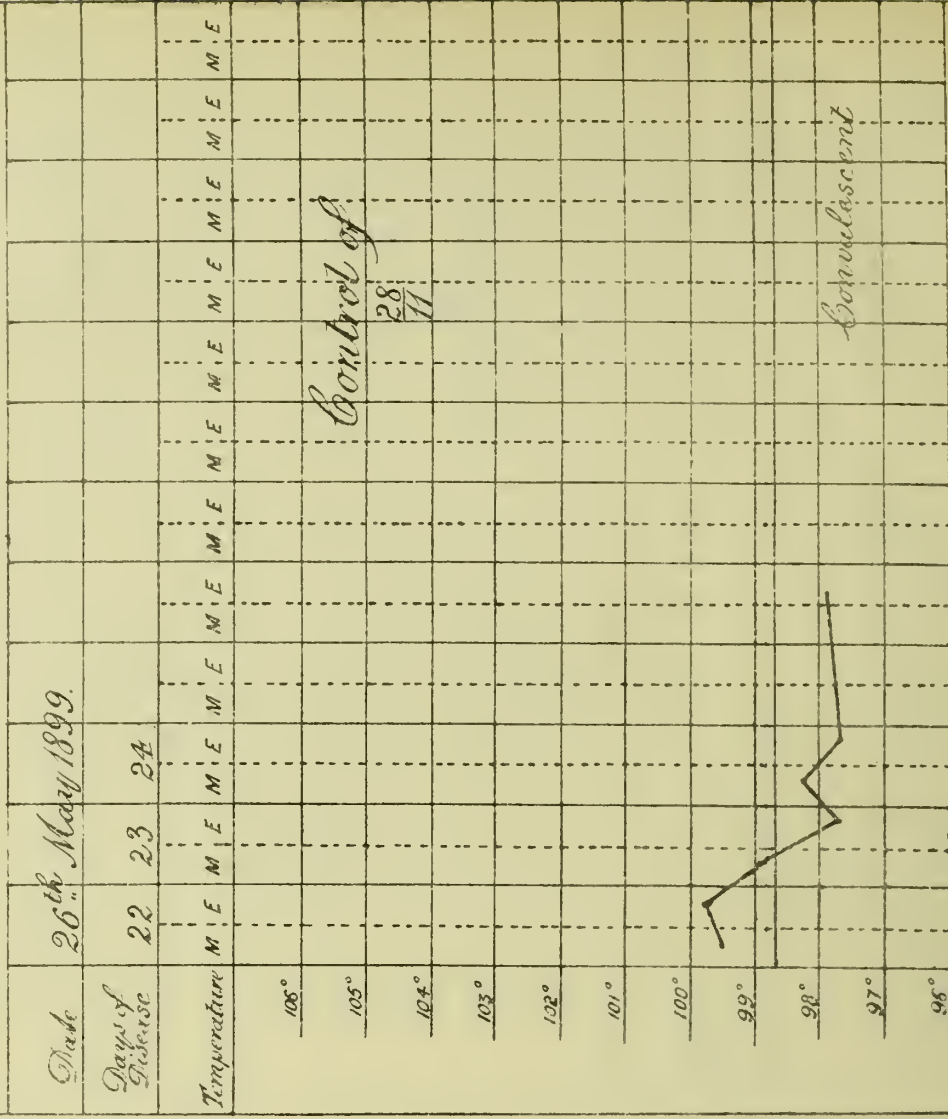
Hospital N^o 1748. Diagnosis: Plague. Previous duration: 7 days.
 Sex: Male, Age: 12, Caste: Hindu Occupation: Nil.



Position of Bubo: R. Cervical and R. Femoral. Result: Discharged after 18 days.

N^o 7

Hospital N^o 1723. Diagnosis: Plague. Previous duration: 22 days.
 Sex: Male, Age: 50, Caste: Mussalman, Occupation: Dyer.

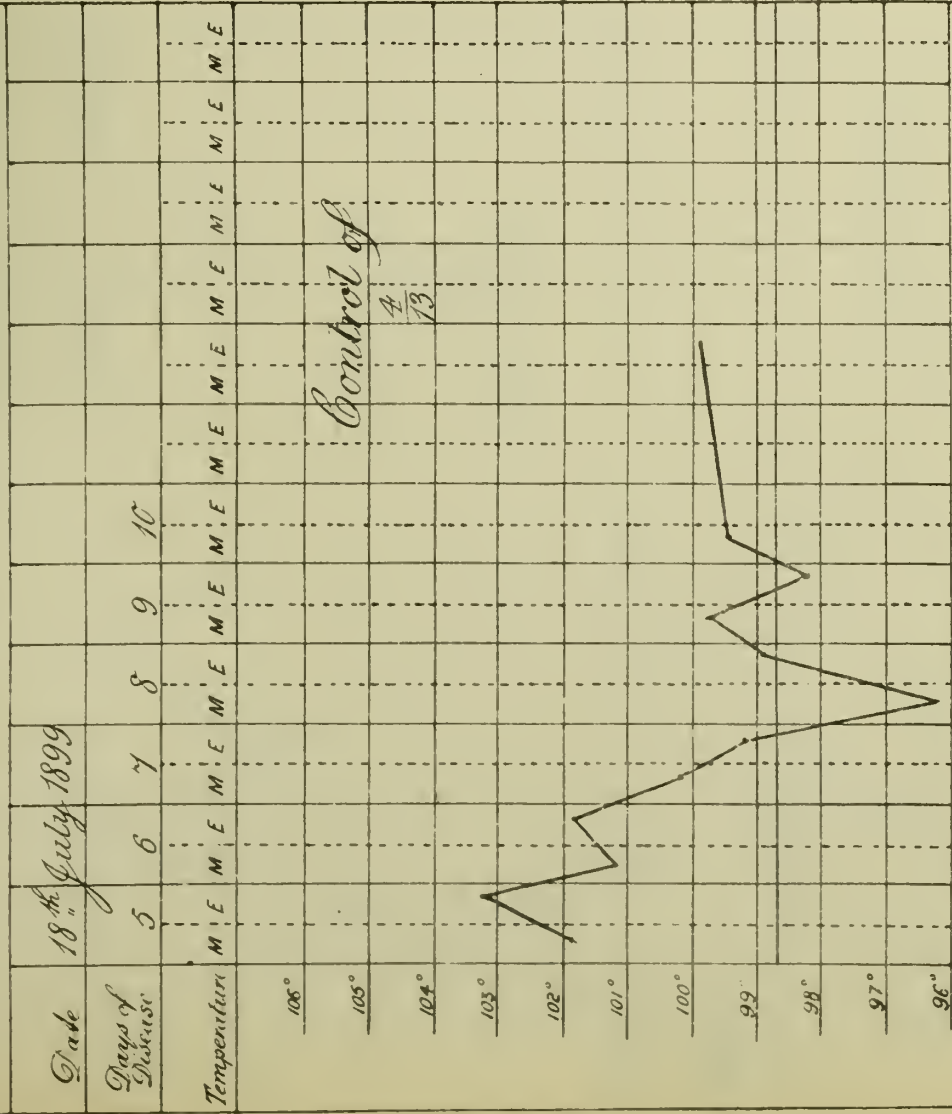


Position of Bubo: Double Inguinal.

Result: Discharged after 19 days.

No 10

Hospital No 1881 Diagnosis: Plague. Previous duration: 5 days
 Sex: Female, Age: 45, Caste: Hindu, Occupation: Labourer

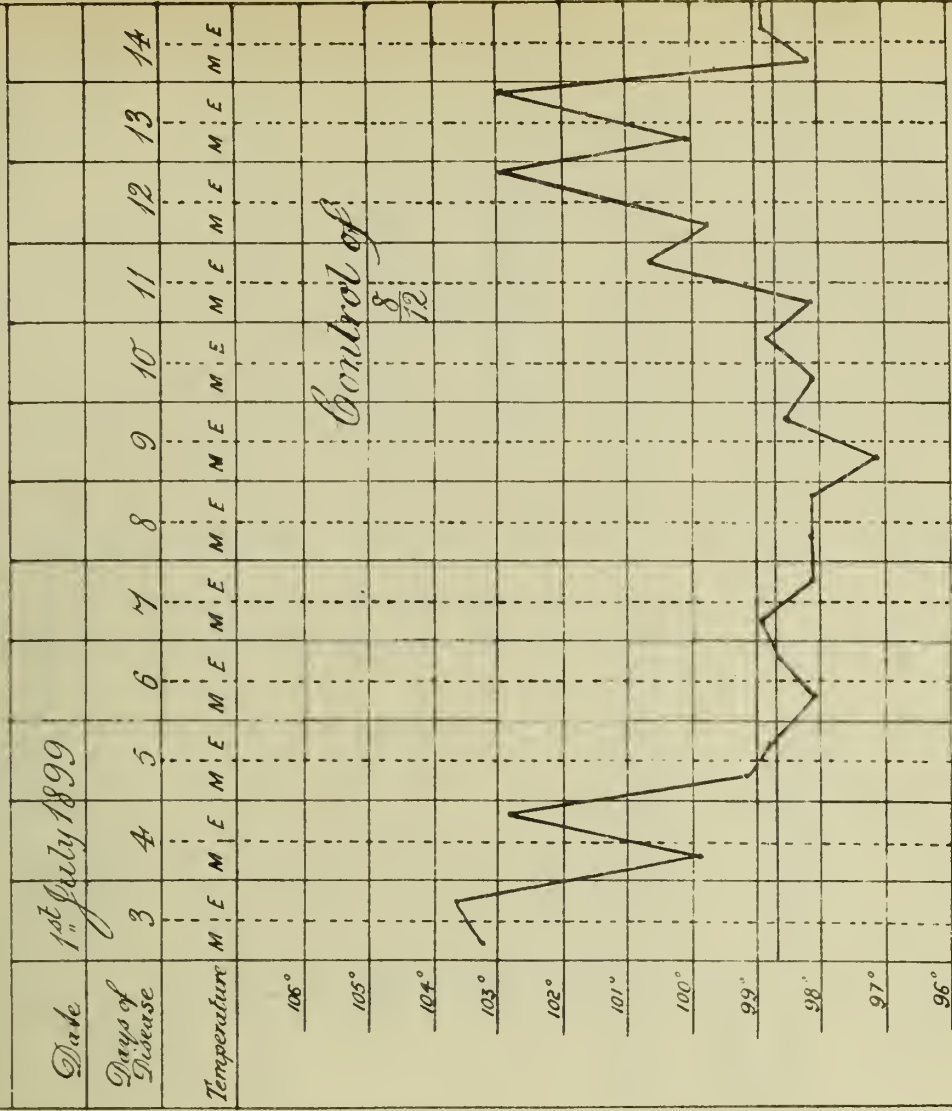


Position of Bubo: R. Axillary.

Result: Discharged after 18 days.

No 9

Hospital No 1828 Diagnosis: Plague Previous duration: 3 days
 Sex: Female, Age: 7, Caste: Hindu, Occupation: Nil.

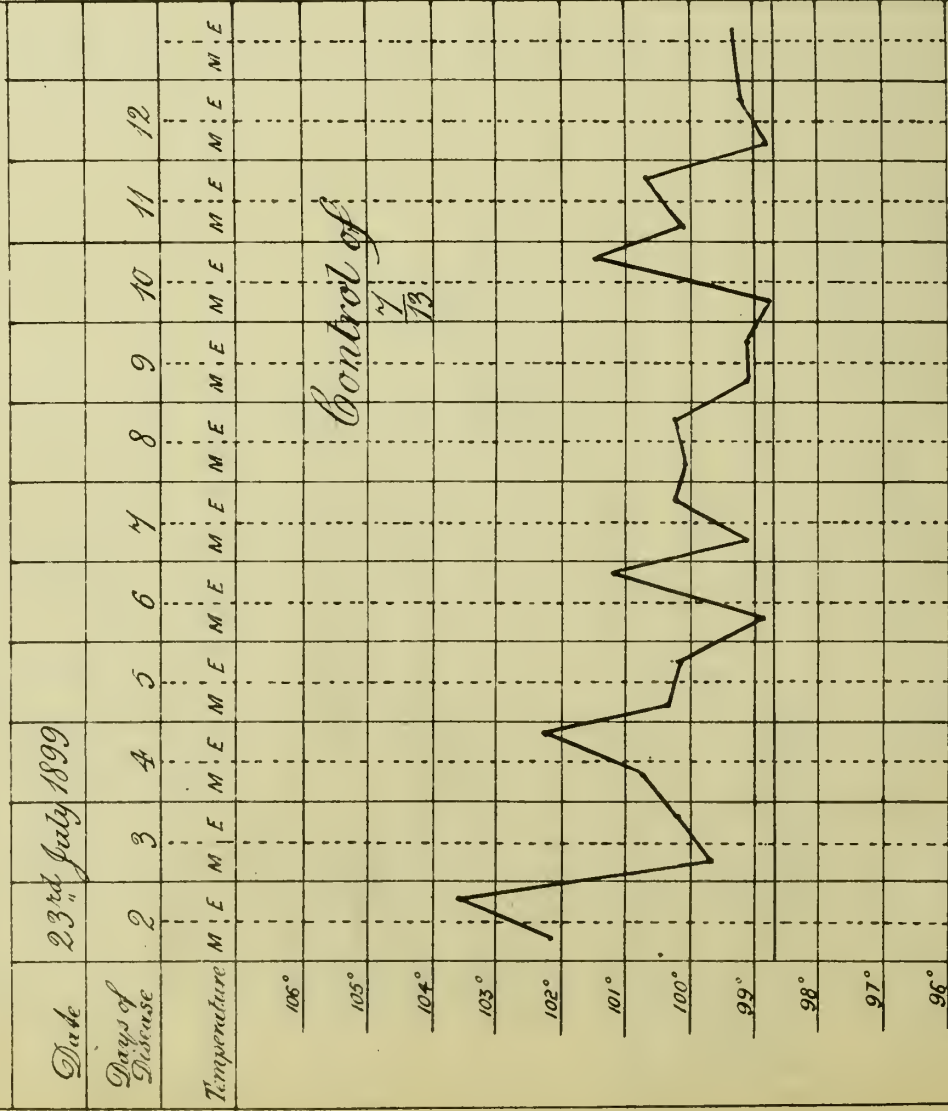


Position of Bubo: L. Femoral.

Result: Discharged after 37 days.

No 12

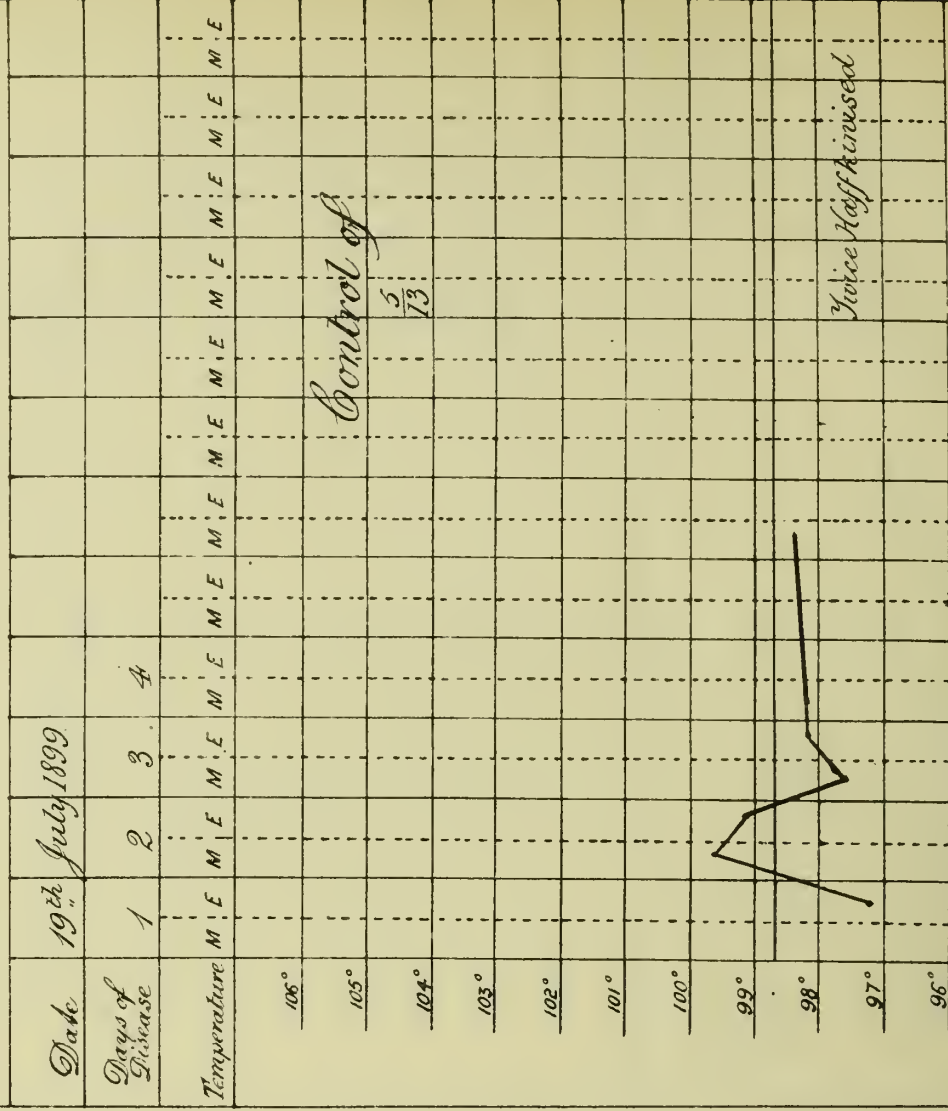
Hospital No 1886. Diagnosis: Plague. Previous duration: 2 days.
Sex: Male, Age: 25, Caste: Hindu, Occupation: Labourer.



Position of Bulb: Subcut. Primary pneumonia. Result: Discharged after 23 days.

No 11

Hospital No 1885. Diagnosis: Plague. Previous duration: 1 day.
Sex: Male, Age: 15, Caste: N. Christian, Occupation: Student.

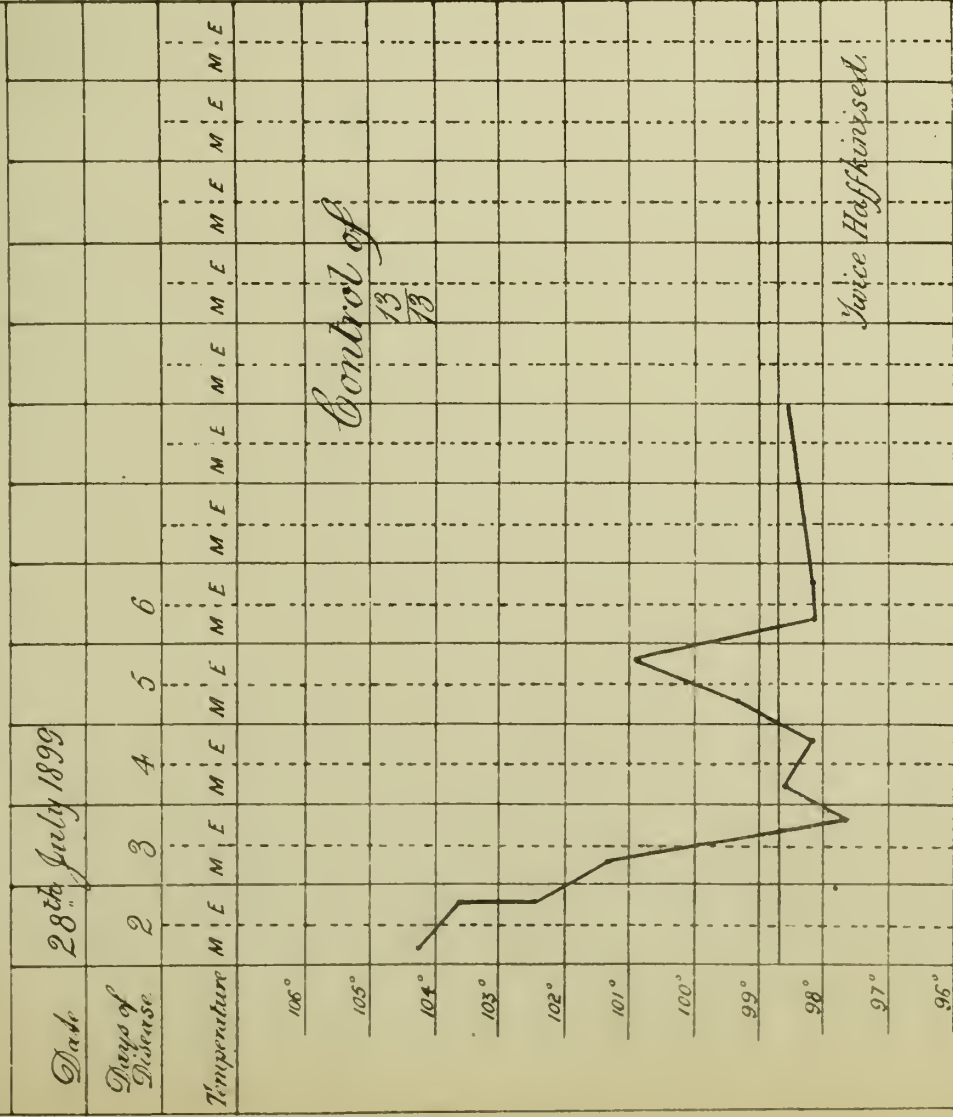


Position of Bulb: L. Femoral.

Result: Discharged after 10 days.

No 14

Hospital No 1914. Diagnosis: Plague. Previous duration: 2 days.
Sex: Male, Age: 8, Caste: N. Christian, Occupation: Schoolboy.

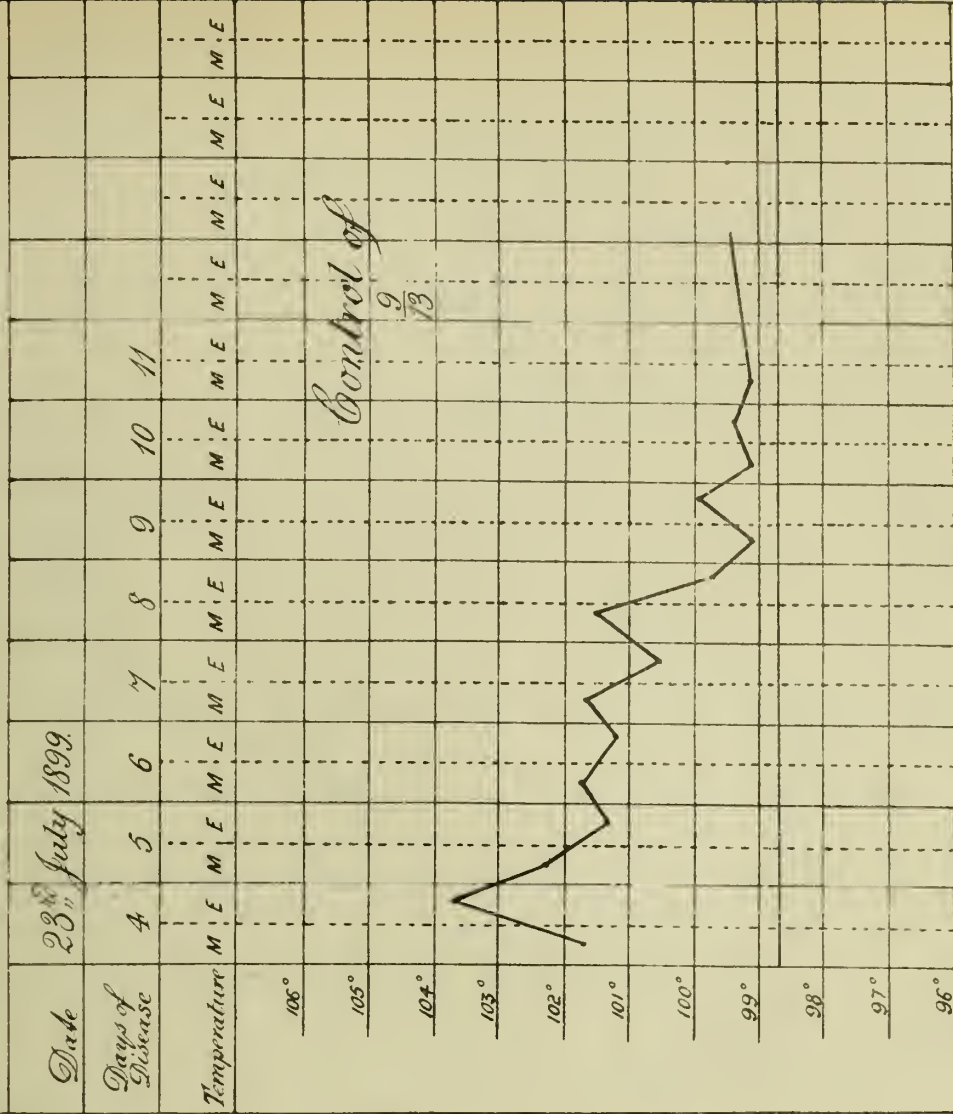


Position of Bub: Double Femoral.

Result: Discharged after 15 days.

No 13

Hospital No 1893 Diagnosis: Plague. Previous duration: 4 days.
Sex: Male, Age: 20, Caste: Hindu, Occupation: Mill-hand.



Position of Bub: Double Inguinal.

Result: Discharged after 24 days

No. 15

Hospital No 1946 Diagnosis: Plague. Previous duration: 3 days.

Sex: Male, Age: 40, Caste: N. Christian, Occupation: School boy.

[illegible]

Position of "Bubo": L. Femoral, Inguinal, and Iliac. Result: Discharged after 22 days.

Ad.

